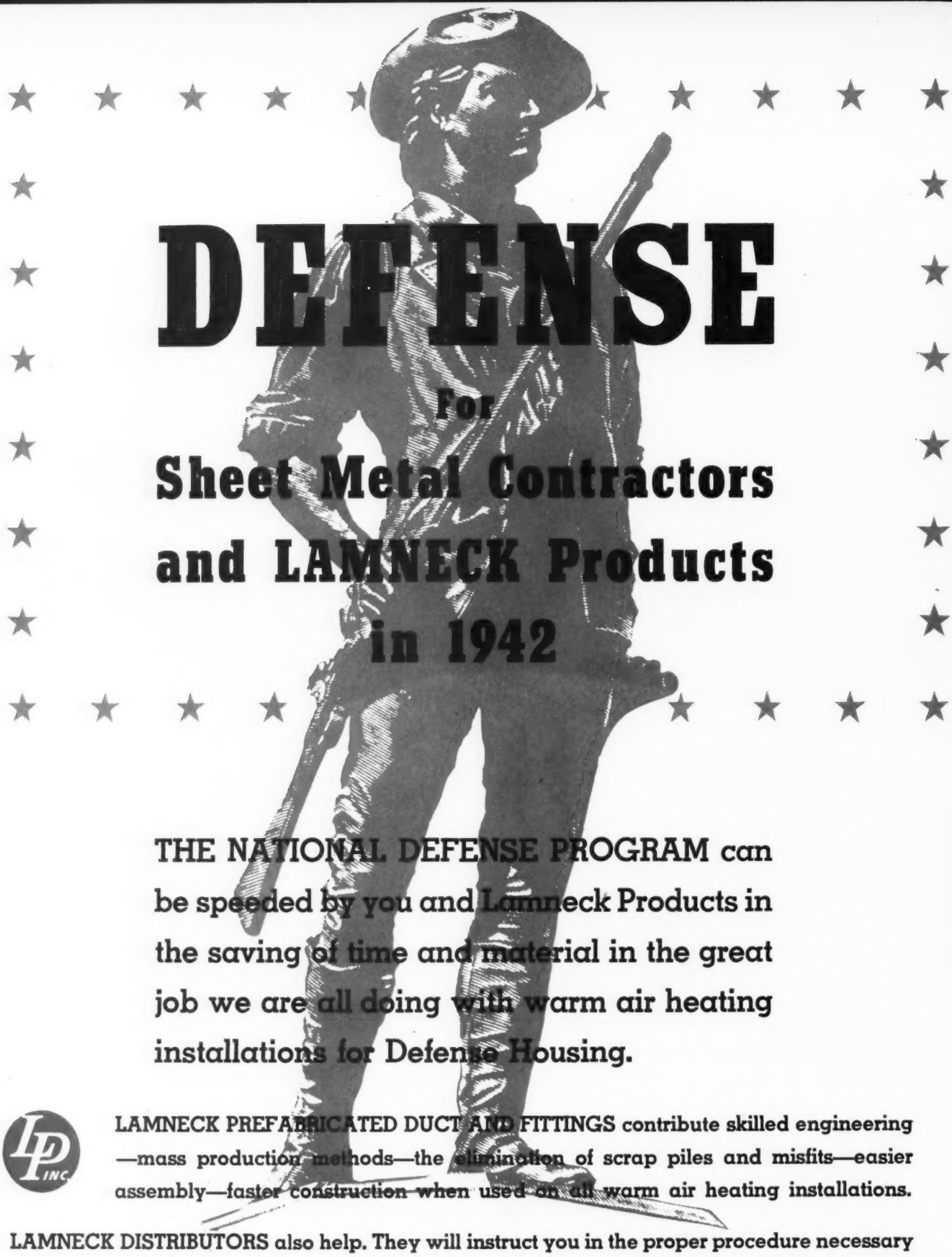
AMERICAN ARTISAN

DECEMBER
1941

RESIDENTIAL AIR CONDITIONING
WARM AIR HEATING • SHEET METAL CONTRACTING

ESTABLISHED
1880



DEFENSE

For

Sheet Metal Contractors and LAMNECK Products in 1942

THE NATIONAL DEFENSE PROGRAM can be speeded by you and Lamneck Products in the saving of time and material in the great job we are all doing with warm air heating installations for Defense Housing.

LAMNECK PREFABRICATED DUCT AND FITTINGS contribute skilled engineering —mass production methods—the elimination of scrap piles and misfits—easier assembly—faster construction when used on all warm air heating installations.

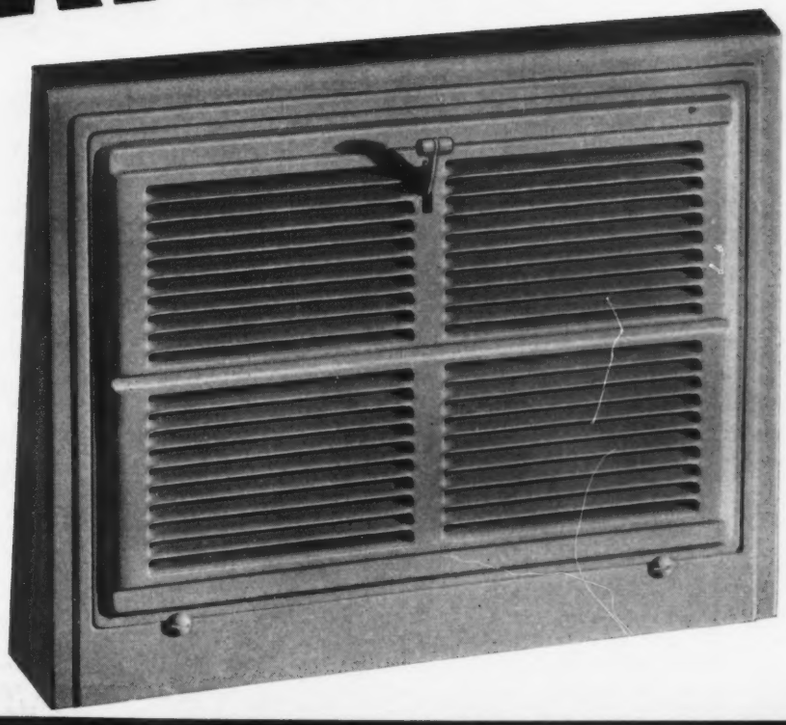
LAMNECK DISTRIBUTORS also help. They will instruct you in the proper procedure necessary to qualify your project so as to secure a Preference Rating under the "Defense Housing Plan."

CONSULT YOUR LAMNECK DISTRIBUTOR FIRST

LAMNECK PRODUCTS INC. Middletown, Ohio

Simplified Furnace Pipe and Fittings and Prefabricated Duct and Fittings for all Types of Residential Gravity and Forced Warm Air Heating and Air Conditioning Systems.

AUER HEAT-RITE . .



MODERN DESIGN *in a* WARM AIR REGISTER

Auer

The Auer Heat-Rite is today's gravity register styled in the modern manner, with the streamlined eye appeal of the finest air conditioning registers. Created exclusively for Auer by an expert industrial designer, it has met immediate acceptance.

The Heat-Rite has a fin type grille, with the slightly downward directional flow so efficient for most warm air purposes, but adjustable for other levels as preferred. Here is a register which does credit to the finest of your new installations, and which is equally adaptable for remodeling or conversion of gravity to modern forced air systems, since dimensions are the same as older standard baseboard models, and thus suitable for existing fittings. Made in 1 and 2 piece types for baseboard, also in wall registers and baseboard intakes. See the Heat-Rite in our new DuraTone lustrous metallic finish, priced the same as standard finishes.

Latest Auer Register Book, showing all designs for both air conditioning and gravity, sent on request. Special Grille Catalog "G" also available.

THE AUER REGISTER COMPANY, CLEVELAND, OHIO

AUER REGISTERS & GRILLES · For Air Conditioning *and* Gravity

AMERICAN ARTISAN

WITH WHICH ARE MERGED

FURNACES AND SHEET METALS

AND

Warm-Air Heating

Covering All Activities in Residential Air Conditioning and Small Commercial Cooling, Warm Air Heating, Sheet Metal Contracting and Fabricating

J. D. Wilder, Editor — A. A. Kennedy, Assistant Editor

Vol. 110, No. 12 — December, 1941 — Founded 1880

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In This Issue

As this issue goes to press the United States has actively entered the war. Probably one of the developments we can expect is a general tightening up of all regulations and a speeding up of the activities we have been experimenting with during the last year.

Unquestionably 1941 has been a hectic year for our industry. On top of being one of the country's biggest building years, we, like all other industries, have been faced with the task of readjusting our thinking and our customary methods of doing business to conform with necessary regulations which permit the country to pursue the war.

Quite likely, further drastic regulations and changes will be necessary during the coming year. It may be well, therefore, that we have had the experience of the last year to acclimate us to what is to come.

This industry will probably find its mission in the heating and protecting of housing units required for the millions of workers who are now or who will be actively engaged in war effort. We have behind us a full year of activity as a guide, so the requirements should not find us unprepared or unfamiliar with the task ahead.

Even more construction seems likely. There will be more army camps and navy stations; quite likely more war materials plants; more and more new or revamped industries engaged in producing war material; the possibilities are right now beyond our comprehension.

It will be our job to heat these houses and buildings. The pattern has been set during the last year—from now on the problem will be quantity and speed. We can't and wont let the country down.

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More than 8,000 copies of this issue are being distributed

S'pose you contractors located near textile plants know all there is to know about dye tanks. But this one I ran into on a defense job was somethin' new to me. It was a Monel tank for dyein' metal airplane parts.

It's a dye bath tank just like you would make for a textile plant. But it sure takes a powerful dye to put color on metal. The stuff they use is so corrosive it would eat out an ordinary tank in no time at all. That's why 7-gauge Monel was specified. Pretty thick sheets to work with all right, but you know how easy Monel is to handle. Wasn't any job at all to install the ¾ inch IPS Monel coil and cast Monel return bends.

Another airplane factory makin' instruments has metal tanks made of ¼ inch steel plate, but you can bet there's a linin' of 22-gauge Monel right on top of that steel. Of course, coils and fittin's are of Monel, too.

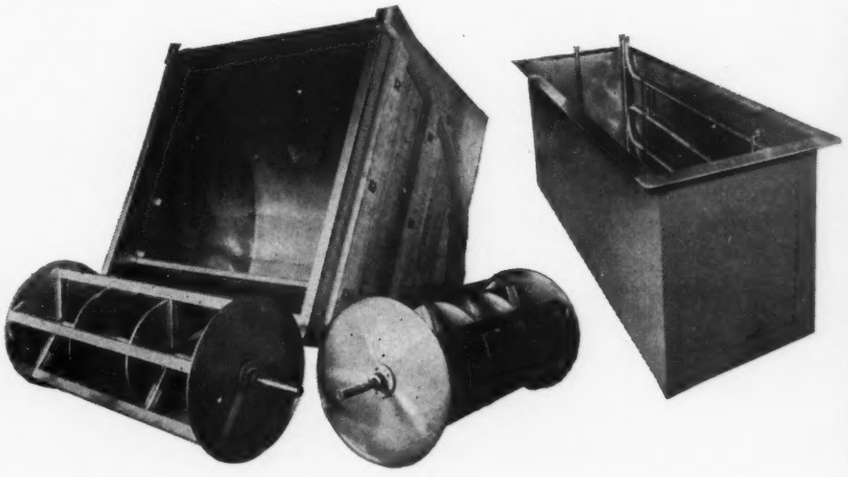
As you know, the use of Monel in dye tanks is an old story. Take the one used to dye felt for the Army. It's lined with 20-gauge Monel. The reels in the front are 36 inches in diameter, and are made from 16-gauge sheet.

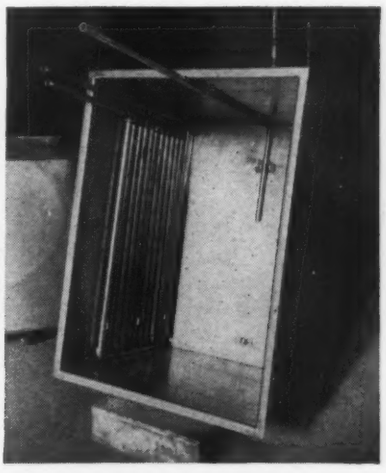
There's good reason for usin' Monel for these tough jobs. It's easy to work an' it welds like nobody's business, not to mention its well-known resistance to corrosion.

There's lots of defense jobs like these floatin' around. Just get in touch with your local O.P.M. Defense Contract Service, and get a few of them for yourself. If you guys need any more dope about workin' Monel, just write to:

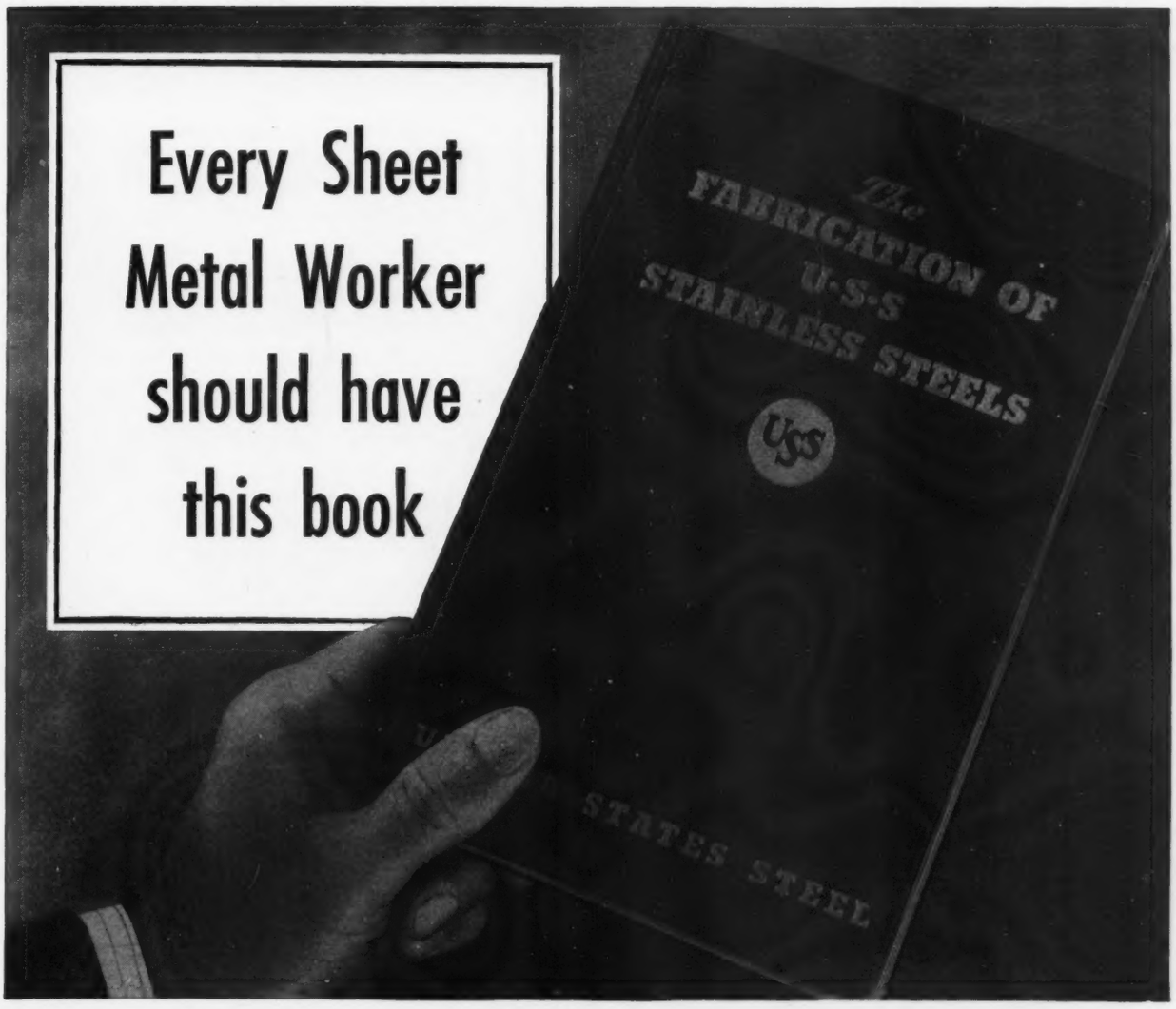
Tim Shears

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street New York, N. Y.





Best Holiday wishes
TO YOU AND YOURS
With problems of priorities and difficulties in getting the things we need to do business, the past year hasn't been exactly a bed of roses for any of us. Neither have we any assurance that next year will be any easier.
Nevertheless, at this joyous Holiday season, we all have the keen satisfaction of having done our part to cooperate with National Defense and to further the progress of the industry as well as the interests of our respective businesses.
Happiness earned is doubly enjoyed. And so we wish to you and yours the full measure of the Holiday season's cheer and joy to which you are so richly entitled. We also want to express our appreciation to our customers and friends for their loyal support, encouragement and patience. There were times, we regret, when it was impossible for us to make deliveries as promptly as we or our customers could wish—or, in some cases, even to fill orders at all. That's why we have been compelled to adopt the policy for the present of serving only our regular customers. This, we feel, is only fair to our old customers but we hope the day will come again soon when we will be in position to consider new distribution outlets.
rh
THE RYBOLT HEATER COMPANY
615 MILLER STREET ★ ASHLAND, OHIO



It is yours for the asking . . . a handsome leatherette-bound book giving complete information about the fabrication of U·S·S Stainless Steels.

It discusses the types of U·S·S Stainless Steel, welding, riveting, soldering, joint design, machining, cutting, forming, annealing, pickling, and surface finishing.

This book is not an ordinary piece of advertising but rather a complete instruction book on better methods of working U·S·S Stainless Steel. It will save you time and money.

There is no charge. Just attach this coupon to your regular letterhead. We are glad to furnish the book to any sheet metal worker who can make good use of it.

★ ★ ★ ★ ★ **Because of the importance of U·S·S Stainless Steels in the National Defense Program, temporary delays in providing for normal peacetime requirements are unavoidable. We believe we can count on your understanding cooperation. Production facilities are being rapidly increased and inevitably we shall win this race against time and National need. U·S·S Stainless Steel will then be more plentiful than ever before.** ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

U·S·S STAINLESS STEEL

USS

AMERICAN STEEL & WIRE COMPANY, *Cleveland, Chicago and New York*
CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
COLUMBIA STEEL COMPANY, *San Francisco*
NATIONAL TUBE COMPANY, *Pittsburgh*
Scully Steel Products Company, Chicago, *Warehouse Distributors*
United States Steel Export Company, New York

UNITED STATES STEEL

United States Steel Corporation Subsidiaries
Room 624 Carnegie Bldg., Pittsburgh, Pa.
Gentlemen:

Please send me your book, "The Fabrication of U·S·S Stainless Steels."

Name.....

Address.....

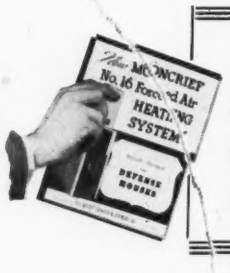
City.....State.....

HERE'S ECONOMICAL Heating for DEFENSE HOUSES

No. 16 MONCRIEF Forced Air Heating System

In this specially designed unit, Moncrief dealers have all it takes to get the heating business for defense houses. No. 16 is compact, sturdily built, fine appearing, has ample heating ability,—60,000 B.t.u's.,—and is priced to land the jobs and make you a profit.

Also in the Moncrief line of gravity furnaces you will find units of the right sizes and prices to meet every defense housing specification.

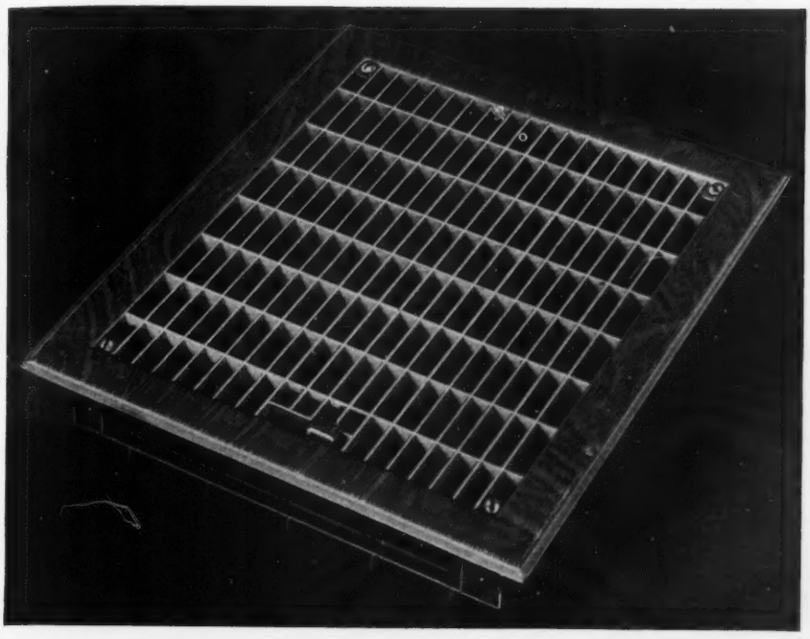


SEND FOR DESCRIPTIVE LITERATURE
Right off the Press

THE HENRY FURNACE & FOUNDRY CO.
3473 E. 49th St., Cleveland, Ohio

Manufacturer of a complete line of
cast and steel furnaces, winter air conditioners for coal, gas or oil, and pipe, fittings and accessories.

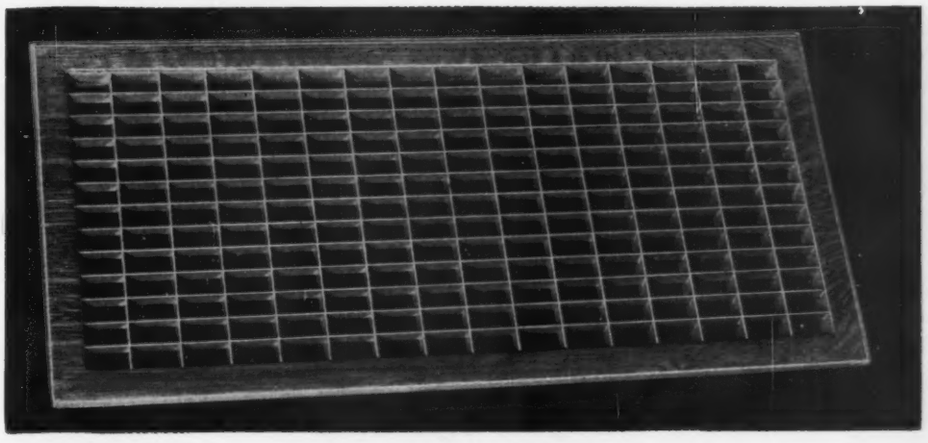
They *Look* Better.. *Are* Better.. *Cost* NO *More*



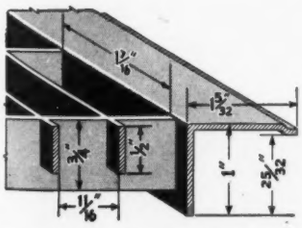
H&C NO-FLEX REGISTERS *and* FACES

Be wise;
Standardize on the Items
that help you get Business!

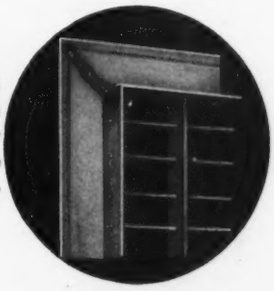
No. 210 FLOOR REGISTER
Standard mesh 7/16" x 1-7/16" inside measurement.



No. 265 RETURN AIR FACE
Standard mesh 11/16" x 1-7/16" inside measurement.



Cross-section of No. 265 Face in 4" to 18" widths x 4" to 60" lengths. Larger sizes are made with deep braces for greater rigidity. Cross members have squared edges for improved walking surface and better appearance and are welded to each other and to the frame at frequent intervals. Margins are straight as a die. Corner joints are invisible on surface.



Illustrating the manner in which corner joints are welded on underside.

The careful, finished workmanship employed in H & C NO-FLEX REGISTERS AND RETURN AIR FACES, the superior finish and excellent, sturdy construction are immediately apparent to anyone who sees them. They fairly radiate "quality"; and that's a mighty helpful factor in convincing your prospects that yours is the best proposal. Why be satisfied with anything but the best, particularly when they cost not a penny more than the ordinary type?

No. 42 Catalog, combining Gravity, Air Conditioning and Furnace Accessory Lines will be issued in January.

HART & COOLEY MANUFACTURING CO.

Warm Air Registers · Air Conditioning Grilles · Damper Regulator Sets · Dampers · Chain · Pulley

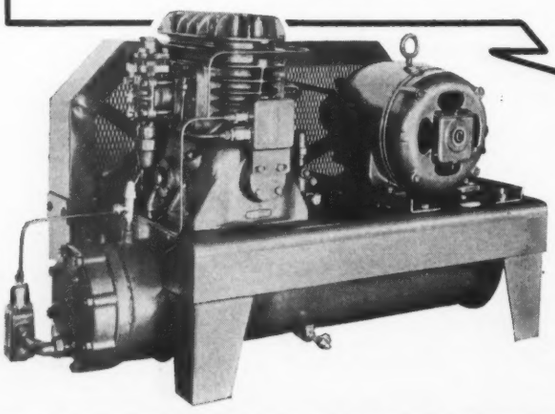
HOLLAND (H&C) MICHIGAN

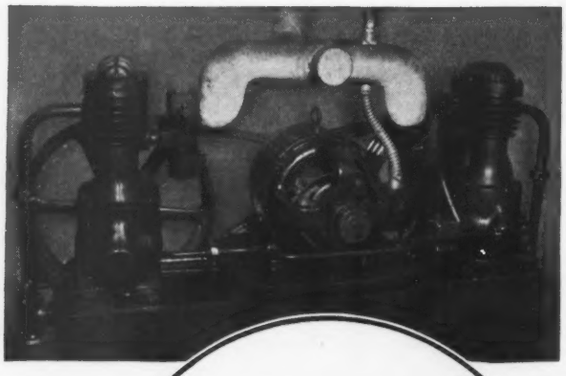
Chicago Office: 61 W. Kinzie St. Philadelphia Office: 1600 Arch St.

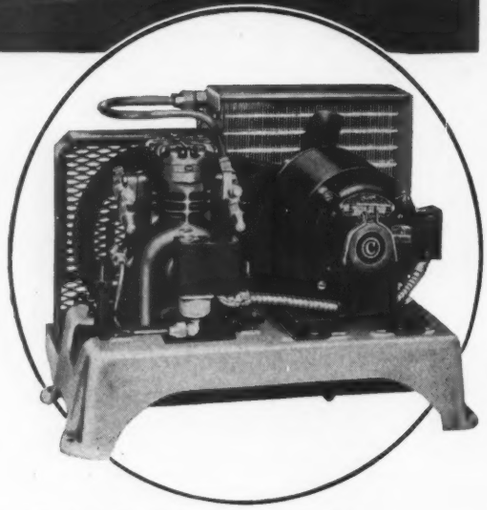
Western Representatives: Godfrey Rueger Co. Los Angeles San Francisco Portland Seattle Salt Lake City Denver

Build Your Present and Future Reputation Now With CENTURY MOTORS

For Every Air Conditioning Need







Top — Century Squirrel Cage Motor driving a refrigeration compressor.
Center — Century Direct Current Motor driving a refrigeration compressor.
Bottom — Century Repulsion Start Induction Motor driving a refrigeration compressor.

232

It's to your advantage — for present and future, post-war years — to be sure that every refrigeration and air conditioning installation is powered to provide smooth, quiet, and economical performance at all times.

How can you be sure of such results? That's easy! By being sure that the motor accurately and adequately meets the starting, accelerating, and running requirements of the installation.

That means specifying Century Job Selected Motors — motors especially designed to meet the demands of each item built by the refrigeration and air conditioning industry.

Whether you are selling and installing unit heaters, coolers, stokers, fans, pumps, blowers, or compressors, it will pay you to use the complete Century line of fractional and integral motors — it's easy for you to select the right motor for the job.

Century Offers These Outstanding Advantages for Air Conditioning Applications

- Unusual freedom from electrical and mechanical vibration
- Century's unique bearing bumpers reduce chatter from V-belt irregularities
- Cushion base mountings isolate possible vibration from your installation
- Quiet starting, quiet acceleration, and quiet running is assured at all times
- The high starting torque so necessary in operating modern compressors

Your nearest Century Motor Specialist will gladly help you and your engineers to select the proper Century Motor for any air-conditioning or refrigeration use. His advice is valuable — call him in today.

CENTURY ELECTRIC CO.
1806 Pine Street St. Louis, Missouri

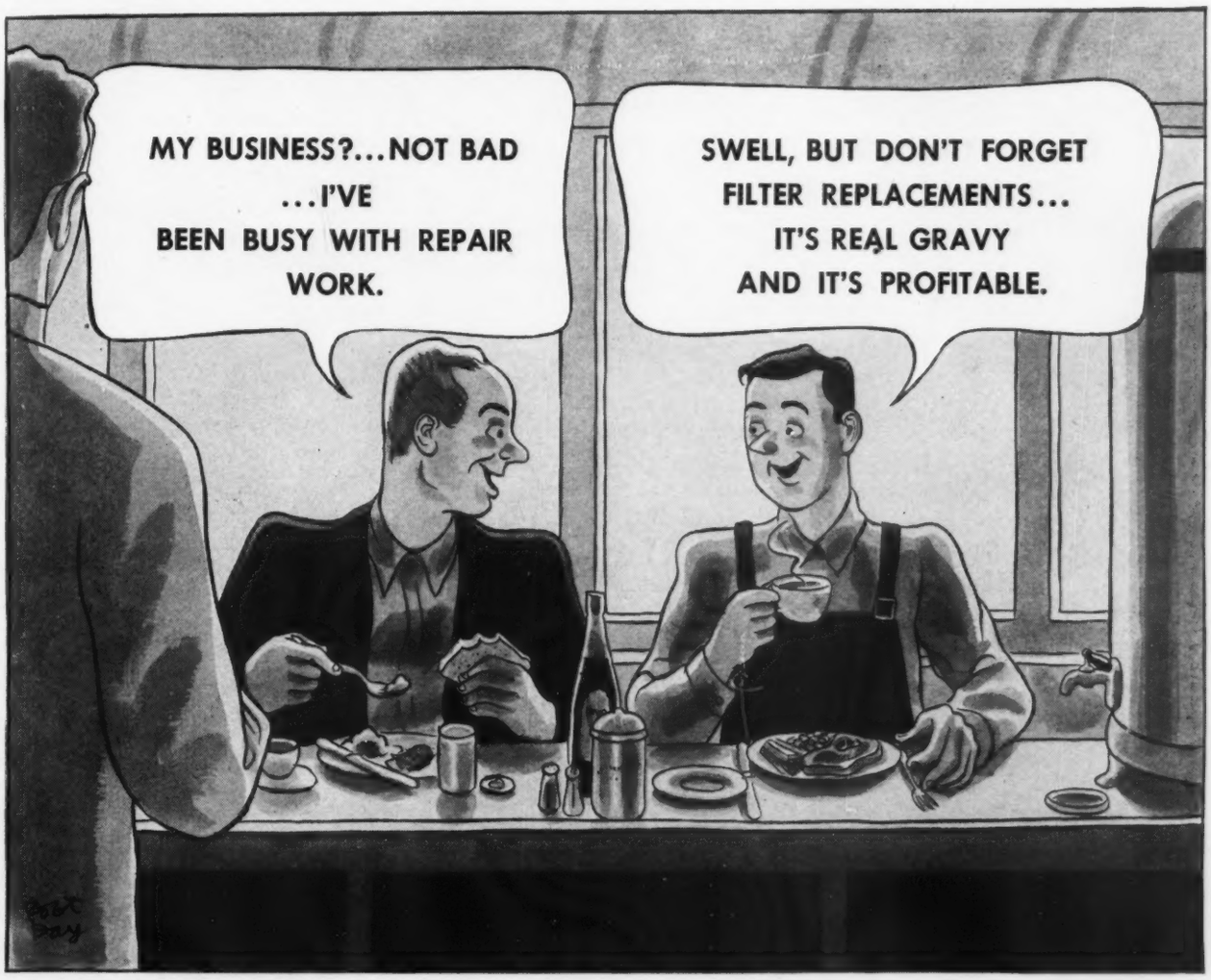
Offices and Stock Points in Principal Cities

Century MOTORS

One of the Largest Exclusive Motor and Generator Manufacturers in the World

Figurin' the Angles

What smart men do in these times to make money with Fiberglas* Dust-Stop* Air Filters


MY BUSINESS?...NOT BAD ...I'VE BEEN BUSY WITH REPAIR WORK.
SWELL, BUT DON'T FORGET FILTER REPLACEMENTS... IT'S REAL GRAVY AND IT'S PROFITABLE.

FREE SALESPLAN DOES EVERYTHING BUT CHANGE FILTERS FOR YOU

On your toes!

In times like these, it's smart to build up with service and repair work. This magazine makes many practical suggestions. This ad itself gives you the dope on the biggest and best set of dealer helps in the filter field.

Build replacement business with a salesplan that practically changes the filters for you!

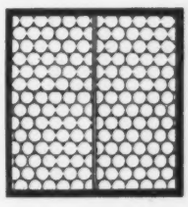
You get—

—*free* mailing pieces, newspaper mats, postcards, radio scripts, and reminder labels for furnaces.

What's more . . . your name and address are imprinted *free* on each.

You're also backed up by a big advertising campaign in American Home, Better Homes and Gardens, Life, and Saturday Evening Post.

These ads tell householders they've got *filters*, they've *got* to change 'em, and to *get* Dust-Stops. Use Dust-Stop's free salesplan to get *your* share of the forced warm-air filter replacement business.



You can make from $2.00 to $3.00 per furnace each year. You service about 200 to 300 furnaces per year. A nice profit? *You* figure it! In addition, this plan helps you get other business . . . furnace cleaning, oil burner adjusting, most types of heating repair jobs.

Write for Dust-Stop's free salesplan today. Get on your toes and start developing this profitable repeat item now.

Your manufacturer or jobber will send you Dust-Stop's free salesplan promptly.

• • •

Owens-Corning Fiberglas Corporation, Toledo, Ohio. In Canada, Fiberglas Canada Ltd., Oshawa, Ontario.

FIBERGLAS* DUSTOP* AIR FILTERS

*T.M. Reg. U.S. Pat. Off.

HANDS ACROSS THE SEA SHAKE ON *Anaconda* QUALITY

SHEET METAL men here in North America long have agreed on the outstanding quality of Anaconda Copper—not just the durability of copper, but the uniformity which characterizes the thickness, temper and finish of Anaconda Copper. But the story continues: Anaconda Copper enjoys an equally fine reputation in many distant lands.

The following statement, quoted from a letter from a sheet metal contractor "way down under" in the Antipodes, illustrates this appreciation of Anaconda quality.

"The writer, as a tradesman, has used Anaconda Copper for the past 15 years and considers it excellent as regards consistent thickness and finish. In fact, it is the only copper that I know to be always free from buckles. We have reason to regret the restrictions . . . on Overseas and particularly American Imports."

Here at home, as well, restrictions on the use of copper are keenly felt. For as defense production forges ahead the copper industry is called upon to match an unprecedented pace. And shortage of this key metal for non-defense use is consequently unavoidable.

The American Brass Company is naturally cooperating with Uncle Sam to the limit of its ability. However, we look forward to the day when we can overcome the inconveniences which now face many of our customers. 4173

ANACONDA
from mine to consumer

Anaconda Copper & Brass

THE AMERICAN BRASS COMPANY, General Offices: Waterbury, Connecticut

Subsidiary of Anaconda Copper Mining Company

In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

Where trustworthy tools are vital

Photo Courtesy Pennsylvania R. R.

It's one thing to build the machines, and the things that the machines make, but it's another thing to get these goods where they're needed. That's where the railroads come in. And the record shows that American railroads are doing a magnificent job in the Nation's emergency. Today, they are in the midst of a tremendous building campaign. When America wants to "deliver the goods," there will be rolling stock ready to do it. Like every other industry, the railroads use Crescent Tools to speed their work.

Crescent Tools include adjustable wrenches, pliers of all types, hacksaws, snips, screwdrivers, etc., etc. They are sold under the "Crescent" and "Crestoloy" trade names by hardware dealers and industrial distributors everywhere.

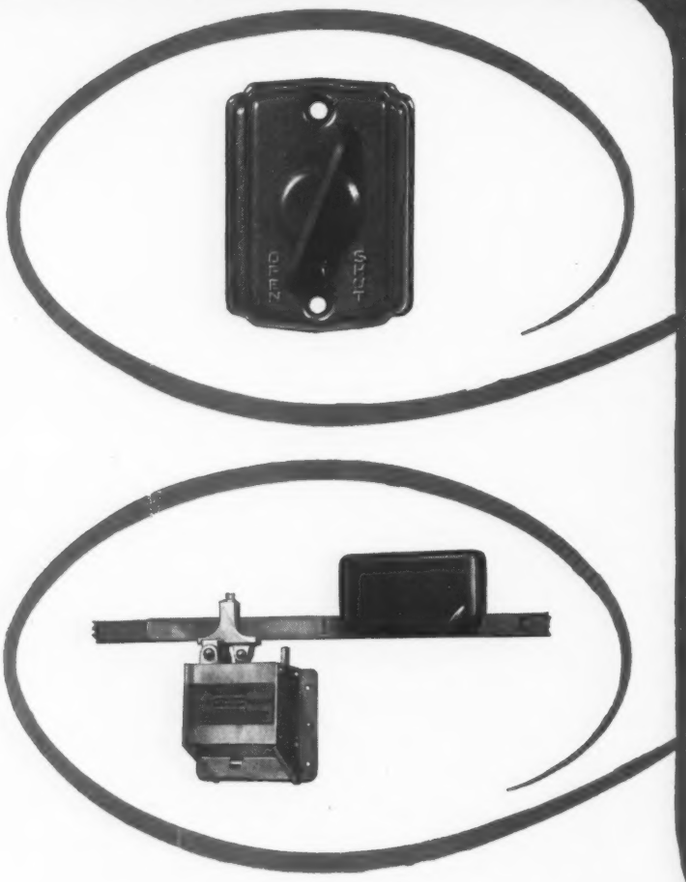
CRESCENT TOOL COMPANY, JAMESTOWN, N. Y.

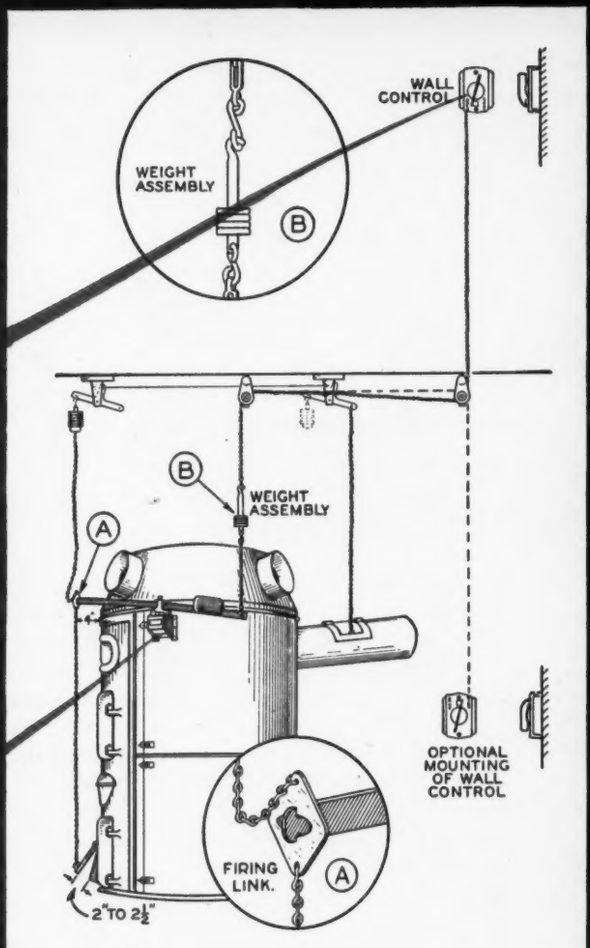
YOU CAN ALWAYS DEPEND ON

CRESCENT TOOLS

FOR DEFENSE H

★ ★ ★ of Price





MINNEAPOLIS-H

Regulator C

E HOUSING

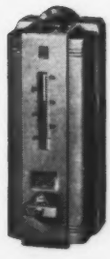
e must come first!

EVEN if price is your first consideration, here is a semi-automatic control package that you cannot afford to eliminate.

The M522-AY1 Metaphram Package offers positive protection against overheating of hand-fired warm air systems, and at the same time greatly reduces fuel consumption by preventing waste heat. Its upstairs control is a great convenience to home owners.

The Metaphram is both an operating and a limit control. It not only provides more healthful and comfortable temperatures, but it conserves fuel and increases the life of the furnace. The Metaphram operates mechanically. There are no wires or electrical circuits and it is especially easy to install. It is M-H quality throughout, yet lists at only $9.50. Even the simplest heating plant deserves the M522-AY1 control package.

You can compromise with cost, but you can't compromise with economy or safety. Minneapolis - Honeywell Regulator Co., 2726 4th Ave. S., Minneapolis, Minn. Canadian Plant: Toronto. European Plant: London. Company owned branches in 49 cities.



For Complete Automatic Control

of hand-fired heating plants, Minneapolis-Honeywell has available Electric Janitor Control Systems. . . . These systems consist of the M26 DAMPER MOTOR - transformer - all necessary wiring and fittings, together with an electrically operated room thermostat—either the plain pattern Acratherm, the Da-Nite Acratherm (illustrated) or the Chronotherm, which automatically lowers temperatures to a fuel-saving level at night and restores it in the morning. They list at $23.00 up. Either of these sets may be installed at any time and the Metaphram then is used as a limit or safety control.

Semi-Automatic

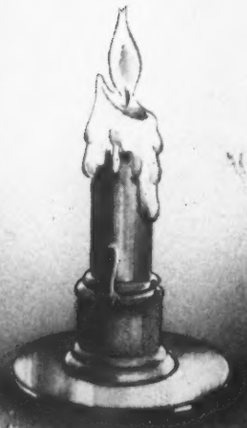
CONTROL PACKAGE

at $9.50 LIST

WHEN YOU ORDER SPECIFY M522-AY1

IS-HONEYWELL

or Company



Again we send this sincere Greeting: Good Cheer on Christmas, Continued Prosperity for the coming New Year

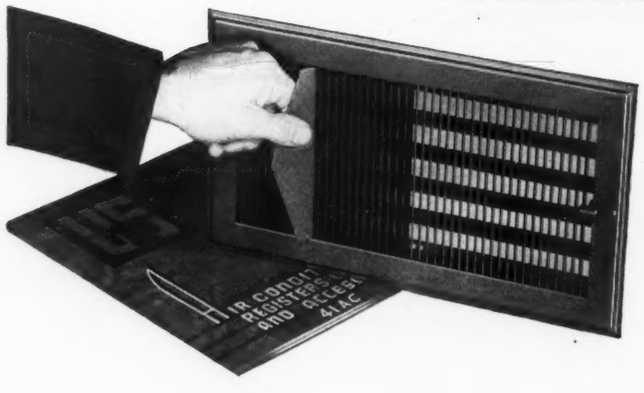
U.S. Registers and Grilles for U.S. Home And Defense Projects

U.S. No. 40 SERIES

GRAVITY BASEBOARD REGISTER

U.S. No. 256

AIR CONDITIONING REGISTER

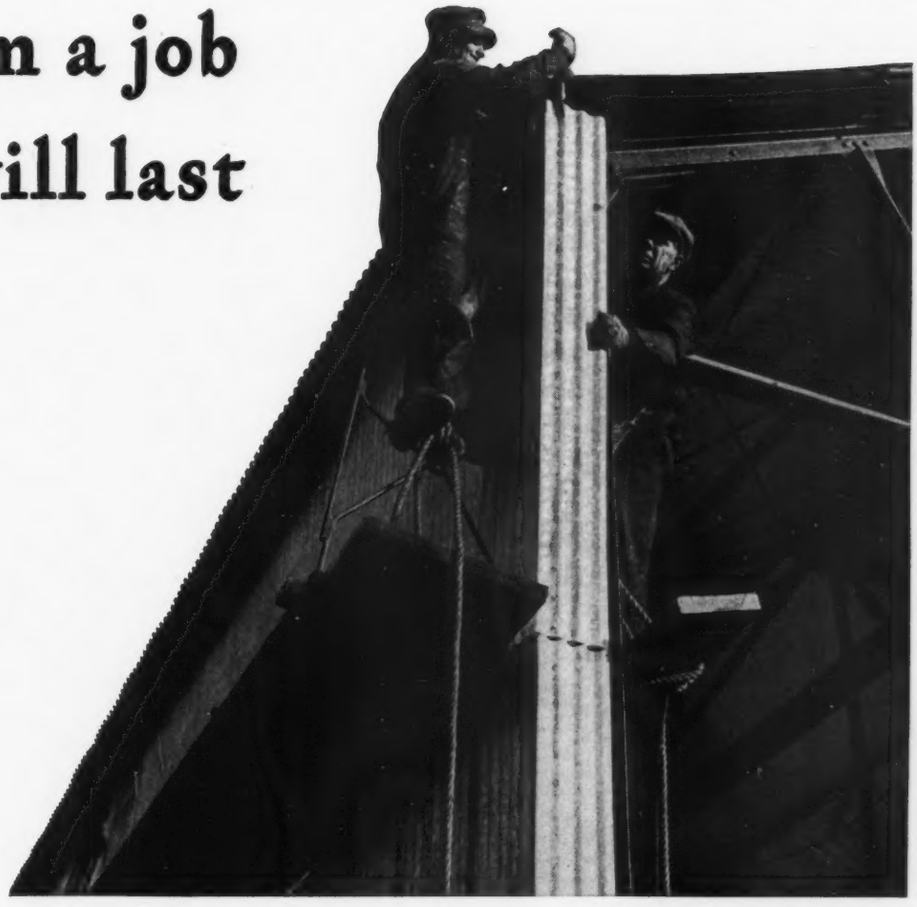


UNITED STATES REGISTER CO.

BATTLE CREEK, MICHIGAN

On defense work...

give 'em a job that will last



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Sheet metal work on defense jobs—whether housing or industrial expansion—deserves the protection of rust-resisting Beth-Cu-Loy Galvanized Steel Sheets. Doubly guarded against corrosion by a tight coating of zinc plus 0.20 to 0.30 per cent copper added to the steel itself, Beth-Cu-Loy Sheets are good for longer life. Yet the added cost is only a few cents more per sheet. When you figure on defense work, include Beth-Cu-Loy in your plans. You'll find these extra-durable sheets easy to work as well as economical.

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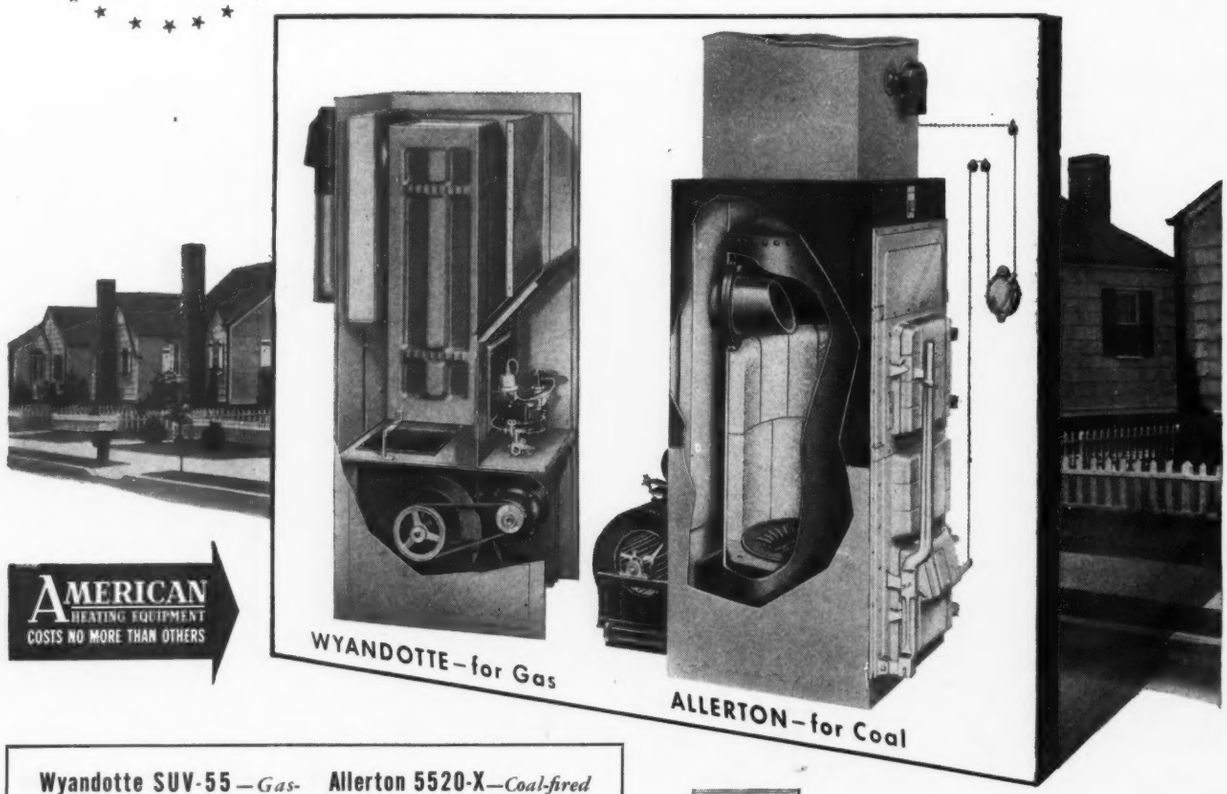
TWO NEW SUNBEAM UNITS FOR DEFENSE HOUSING



Wyandotte SUV-55—*Gas-fired Winter Air Conditioner*

Heating Element and Radiator of welded heat-resisting steel • Suede finish Placid Blue jacket. Slip joints make easy assembling • Two control combinations • Return air can enter from right, left, or front. Filter with rack optional at slight extra cost • Btu capacity at register 39,600 • Width 22"—depth 25⅜"—height 60½".

Allerton 5520-X—*Coal-fired Winter Air Conditioner*

No. 8 gauge steel Heating Element • Placid Blue and Black jacket • Quiet double inlet type blower, with cabinet and filter optional at slight additional cost • Btu capacity at register—with soft coal 64,700; hard coal or coke 51,800 • Width 26"—height 59"—depth without blower and cabinet 25¼; with blower and cabinet 43¼.

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The products illustrated herein are normally available for prompt delivery. Our ability to furnish these, as well as the products shown in our catalogues, is subject to the needs of the National Defense Program.

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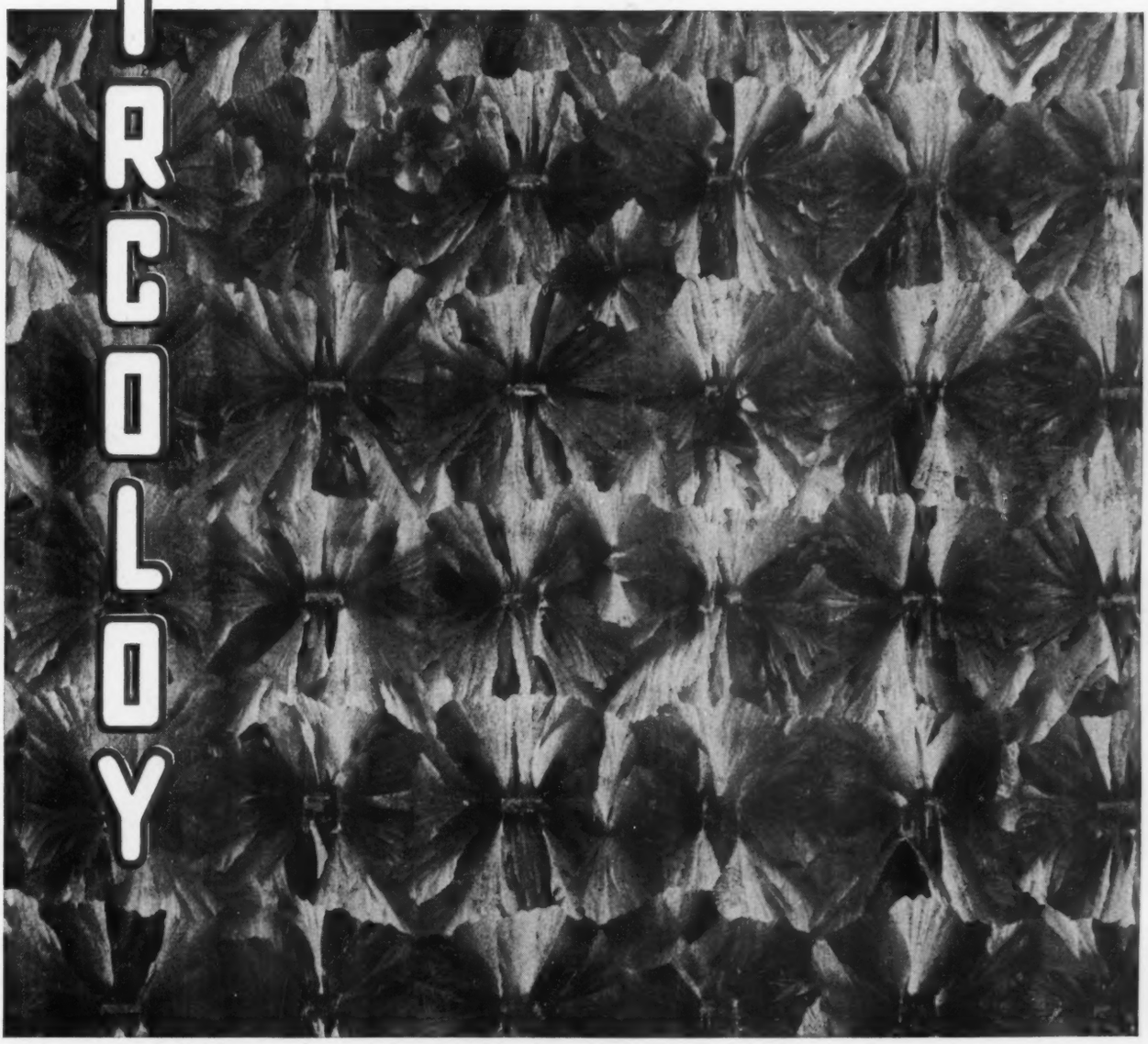

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Sales Offices in Principal Cities

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NATIONAL STEEL CORPORATION

Executive Offices, Pittsburgh, Pa.

ALTHOUGH nearly two thousand years old, Christmas is, and we hope always will be, a day which all children await with eager expectancy. But to grown-ups, it is more often the time for thinking back over events of the year which is drawing to a close.

Now, when we all have many problems, your kindly acceptance of the constant changes which are taking place helps to make our work much more pleasant. Mere words and cold type, therefore, can not impart the warmth and sincerity which we would like our Season's Greetings to express. And so, as we say the usual, but heartfelt, Merry Christmas and Happy New Year, we want to add an equally sincere Thank You.

THE J. M. & L. A.

OSBORN Co

CLEVELAND, OHIO

BUFFALO • CINCINNATI • DETROIT

Manufacturers—Distributors of Metals and Metal Products

A DEPENDABLE SOURCE OF SUPPLY FOR 82 YEARS

3 WAYS to keep your shop busy in 1942

1. High-priority defense home-building
2. Home modernization
3. Furnace repairs and replacements

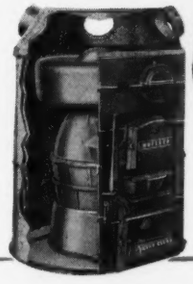
—and here's what you need for No. 1

These moderately priced **MUELLER Furnaces** are suitable for $6000 "defense homes"—as well as modernization and replacement

For a successful year in 1942, get your share of these three classes of work which government authorities consider essential — and do it with first-quality Mueller equipment . . . There is no job so small that you can afford to "take a chance" with your reputation, by installing inferior makeshift furnaces. Stick to goodlooking, dependable Mueller furnaces for *all* your jobs. If you need heating equipment for a single defense house or a large group of houses — for factory buildings, barracks, airplane hangars, warehouses, etc. — for use with any fuel — ask your nearest Mueller distributor or write . . .

L. J. Mueller Furnace Co.,
2010 Oklahoma Avenue,
Milwaukee, Wisconsin.

Coal



MUELLER SERIES F COAL-FIRED FURNACE. Known for its unfailing performance and long life.

MUELLER SERIES 400 COAL-FIRED STEEL FURNACE. Dependable, economical performance.

Oil

New MUELLER SERIES OVP VERTICAL OIL-FIRED WINTER AIR CONDITIONER. Equipped with Mueller Vaporizing Oil Burner.

New MUELLER SERIES OHP HORIZONTAL OIL-FIRED WINTER AIR CONDITIONER. Designed especially for basement installations.

D-21

Gas

New MUELLER SERIES CVP ALL-CAST-IRON (and SHP STEEL) GAS-FIRED WINTER AIR CONDITIONER. Small, compact, cabinet types for utility room, basement.

New MUELLER SERIES GS90 GAS-FIRED GRAVITY FURNACE. Highly efficient up-draft design. Also GR90 with round casing.

MUELLER FLOR-AIRE GAS-FIRED FLOOR FURNACE. Completely self-contained. Also Dual Flor-Aire with wall registers for two adjacent rooms.

MUELLER *Milwaukee* HEATING AND AIR CONDITIONING

ANOTHER YEAR ADDED TO THE RECORD OF

Twin Contact Controls

Remarkable freedom from service troubles in any line of controls, through a single season, can be a matter of luck. But when that same immunity to expensive service calls is repeated year after year—and when this extends to new models as they are introduced from time to time—you know it isn't luck—it can only be proof of inbuilt quality.

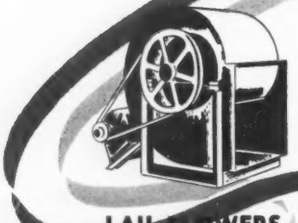
Old Father Time has thus proved the quality of Twin Contact Controls. Dealers and their service men, most of them long-experienced in the field of automatic heating, continue to rank Twin Contact Controls first in unequalled performance.

In more than one sense of the word, Twin Contact Controls are here to stay. New or old, they keep on building customer good will for the automatic heating units on which they are standard equipment.

PERFEX CORPORATION *Milwaukee, Wisconsin*

AWARD
FOR UNEQUALLED FREEDOM
FROM SERVICE TROUBLES
1940
Twin Contact Controls
AWARD
FOR UNEQUALLED FREEDOM
FROM SERVICE TROUBLES
1941
Twin Contact Controls
Twin Contact Controls

LET'S WORK TOGETHER FOR UNCLE SAM



LAU BLOWERS

● National Defense has created a grave need for more than just defense weapons. To have guns, tanks, planes and ships, America must have workmen . . . and workmen need clean, heated homes.

The Defense Housing program calls for the erection of some 625,000 defense homes in 1942. Priority assistance for 300,000 homes has already been granted, and many will have forced-air heating plants.

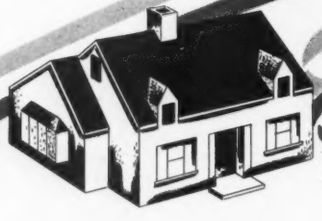
Next year, at least 200,000 buildings repaired under the liberal FHA pay-out-of-income "Repair for Defense" program should be equipped with new furnaces, or a blower-filter unit added to the present installation.

This is your opportunity. Now you can not only get the jobs, but also the materials since every defense job carries the necessary priorities.

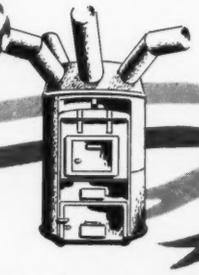
Let's work together for Uncle Sam. See your Lau jobber, or write us today for prices and deliveries on Lau Blowers and Blower-Filter units.

THE LAU BLOWER CO. Dayton, Ohio

BLOWER FILTER UNITS



DEFENSE HOUSING



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Buy U. S. Defense Bonds Too!

YOU SHOULD HAVE

THESE BIG 10 to 1 PROFIT POINTING BOOKS *NOW!*

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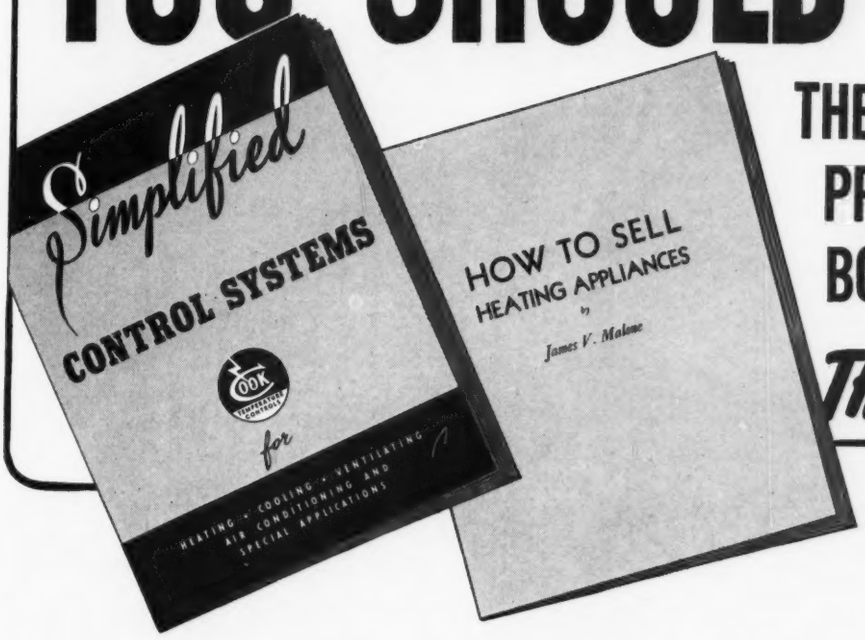

IF you would like some real help in selling heating appliances of all kinds we have it for you. Write us at once for free copies of "How to Sell Heating Appliances" and "Simplified Control Systems." These books will open the way for you to scores of profitable sales and show you how to make 10 sales, 10 satisfied customers out of every 11 prospects you have. Fill in and mail the coupon below today. We'll send you the books absolutely free.

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Cook "400" Heat Regulator Sets give you maximum installation convenience and profit and give your customers greater economy and satisfaction. Here are a few "400" features:

Syncro-Action for perfect synchronization of rate of combustion of any solid fuel with any heat requirements.

No danger of overheating or fire. Current failure or blown fuse causes safety feature to close draft and open check insuring complete safety.

Clutch puts damper arm in neutral position with draft and check closed for smokeless and gasless firing. No service. No gears to grind, no bearings to oil, no batteries to wear out. Guaranteed for five years.

The "400" Heat Control Set includes everything needed for quick easy installation. Modern design and styling.

The Cook "400" Regulator Set

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Chicago, Illinois

Please send me at once FREE copies of "How to Sell Heating Appliances" and "Simplified Temperature Control."

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2

FOR DEFENSE

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The new United States Defense Savings Bonds and Stamps give all of us a way to take a direct part in building the defense of our country.

This is the American way to provide the billions needed so urgently for National Defense.

★ United States ★ DEFENSE SAVINGS BONDS and STAMPS

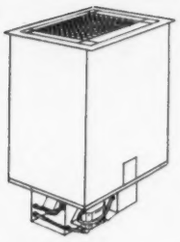
THIS MESSAGE IS PUBLISHED BY US IN THE INTEREST OF NATIONAL DEFENSE

KEENEY PUBLISHING COMPANY
6 North Michigan Avenue, Chicago, Illinois

Here are SIX OIL FURNACES for DEFENSE HOME HEATING

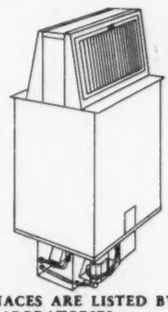
14 Sizes—Heat Outputs from 46,000 BTU to 125,000 BTU

SIX UNITS . . . 14 SIZES



STANDARD REGISTER FLOOR FURNACES

Low installed cost. Saves steel, saves labor, saves fuel. Factory assembled. Needs NO ducts, no basement. 46,000 BTU or 68,000 BTU register output. Exclusive full automatic control with electric ignition, or manual control.



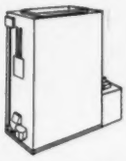
DUAL WALL REGISTER FLOOR FURNACES

As above, but with warm air discharge through two registers for more uniform heat distribution. No ducts, no basement. 46,000 BTU or 68,000 BTU heat output. Available only with full automatic operation and electric ignition.

ALL H. C. LITTLE FLOOR FURNACES ARE LISTED BY THE UNDERWRITERS' LABORATORIES.

AUTOMATIC "COTTAGE"

Gravity warm air basement furnaces. Four sizes—50,000 to 95,000 BTU at bonnet. Minimum ductwork. Quiet operation, fully automatic, electric ignition.

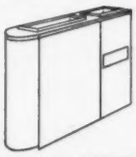


MANUAL "COTTAGE"

Lowest in cost of any H. C. Little furnace. Very quiet operation. Manual control only.

SIZE A, TYPE AC

Small-home winter air-conditioning, basement type. 77,000 BTU at bonnet. Filters, blower, automatic operation, electric ignition.



SIZE B, TYPE AC

As above, but with 125,000 BTU output.

ALL UNITS LISTED BY UNDERWRITERS' LABORATORIES . . . ELIGIBLE FOR PREFERENCE ORDERS UNDER PM-1192.

AN OUTSTANDING UNIT

Eight times out of ten, you can solve one of your biggest problems—which is to provide modern oil heat at low installed cost in defense homes—by using H. C. Little oil-burning Floor Furnaces. Listen to C. Edgar Wood, sales agent for 112 small homes at Dundalk, Md., for which the builders chose H. C. Little Floor Furnaces: *"We feel that the (H. C. Little Oil Floor Furnace) is the best heating unit for small homes on the market today . . . we do not hesitate to recommend your unit to anyone who is interested in heating a small home."*

REASONS FOR SUPERIORITY

Pioneered by H. C. Little over nine years ago, the Oil Floor Furnace now has a record of thousands of successful installations. Here's why: Low first cost. Low-cost installation . . . compact, factory assembled . . . saves metal, no ducts . . . no basement needed. Low upkeep . . . burns cheap No. 3 furnace oil . . . compact vaporizing burner, no moving parts. Listed by Underwriters' Laboratories. Manual control or full Automatic operation, electric ignition and Thermostatic control. Single floor register or dual wall register models available. (See panel at left.)

OTHER SMALL-HOME FURNACES

Also designed exclusively for small homes are the other oil furnaces shown. Warm air, basement type, they feature low installed cost and money-saving operation. With them and the oil Floor Furnaces you have six time- and money-saving solutions to Defense Home heating.

MONEY-SAVING BURNER

All units are equipped with the trouble-free H. C. Little Burner . . . the only vaporizing burner with full automatic operation and electric ignition. Listed by the Underwriters' Laboratories . . . burns No. 3 oil . . . no moving parts to wear out . . . no pilot light to cause soot or carbon. Also available with Manual Control.

Send for Free Booklet!

Write for your free copy of "Six Low-Cost Furnaces for Defense Homes." This 12-page booklet is chock-full of down-to-earth facts: specifications, installation diagrams and cutaway photos. Send for it today!

H. C. LITTLE BURNER CO.
San Rafael, California

Please send me free, "Six Low-Cost Oil Furnaces for Defense Homes."

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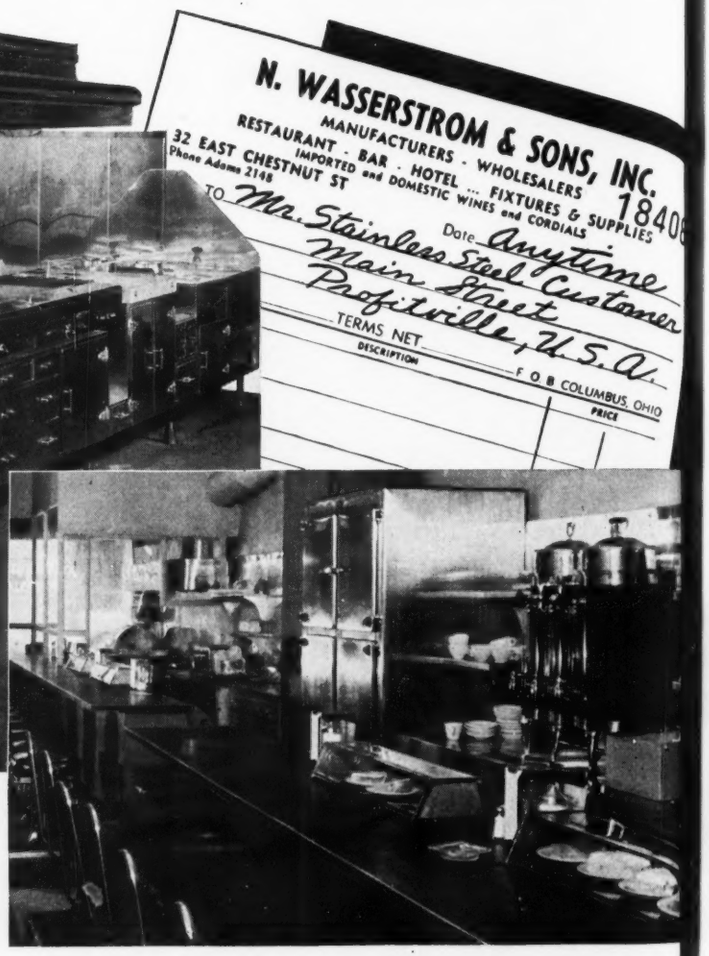
WAREHOUSE STOCKS and Direct Factory Representatives in Boston, Newark, Baltimore, St. Petersburg, Chicago, Des Moines, Seattle and Portland (Oregon)

"We GET business—and HOLD it with *Republic Enduro Stainless Steel*"



For the past 9 years, N. Wasserstrom & Sons, Inc., 32 East Chestnut Street, Columbus, Ohio have specialized in the use of Republic ENDURO Stainless Steel for the restaurant fixture end of their sheet metal business. One of their 22-foot open kitchens is shown above at the left. Another open restaurant job is shown at the right.

Although operating a large, fully-equipped shop, they neither use nor need special equipment to fabricate ENDURO. As Mr. Wasserstrom says: "Any good workman can fabricate ENDURO on standard sheet metal shop equipment."

And Mr. Wasserstrom continues his story as follows:

"Profitable business is always hard to get—and it's harder to hold unless every job can be used as a demonstration of quality workmanship and material to help land the next one."

"We install from 10,000 to 12,000 pounds of stainless steel a year—so we need a metal that fabricates easily, that meets restaurant fixture requirements, that looks good and that wears well."

"We are proud of every ENDURO job we install. We've had some intricate shapes to make and some tricky forming and welding to do on ENDURO—but we've never had a job yet that we couldn't fabricate satisfactorily from ENDURO."

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Are you just a little doubtful about the fabrication or welding of stainless steel? Let us send you a copy of Republic Booklet 322 which will tell you how to obtain best results with Republic ENDURO by various methods. If you're interested in welding, ask also for a copy of Booklet 373.

REPUBLIC *Enduro* STAINLESS STEEL

REG U.S. PAT OFF

Vol. 110 American Artisan No. 12

Heating Must Keep Pace with House Changes

HEATING contractors may not be aware of it as yet, but a very interesting development has been taking form in house design and construction during the past eight months.

We refer to architects' and builders' careful sizing of houses in order to reduce material waste to a minimum. Whereas, formerly a builder or architect sized his house to fit the lot, or achieve a certain appearance, today this same house is sized to use full lengths of foundation blocks, sheathing board lengths, standard framing, standard joist lengths—result, practically no scrap pile left over.

In many areas we have found that this determination to reduce waste has led the builder to carefully check the costs of all his sub-contracting with the result that many builders can now tell the sub-contractor his actual material costs within a few pennies. At the same time, these same builders have checked labor costs and can now tell sub-contractors what his labor costs should be.

This is not to say that under these conditions there is no reason for taking bids. Builders still cannot tell how much profit the sub-contractor is willing to forfeit—nor can they prevent the foolish sub-contractor from entering a bid below cost.

The circumstance which has brought this development into being, of course, is the ceiling of $6,000 now in actual effect in most areas. In order to offer the most house for the money, the builder, probably for the first time, has had to investigate ways and means whereby his waste is eliminated.

The point of this, for the heating contractor, is that if builders go to such lengths to reduce waste—but retain profit—there is equal reason for the heating contractor to look about for ways and means whereby he can offer satisfactory, substantial heating—with profit—at the lowest possible cost.

There are several interesting possibilities involved. First, of course, is the basic cost of the furnace. With houses getting smaller and smaller; with many builders using one or more types of insulation; with smaller attics or basements or even no basement—we require a smaller furnace. Equivalent heat loss housing units erected by the government are being heated with furnaces for which the government is paying from $46.00 to $70.00 depending on whether the system is gravity or forced air and the fuel coal, oil, or gas. These were special furnaces a year ago; they are now standard production with most manufacturers. If contractors have not been using these furnaces for their basementless houses they are overlooking a possibility.

In this same type of basementless house, space for the furnace is being provided in a utility room, a closet, a corner of the garage—the chief aim of the architect and builder being to keep the duct work to a minimum. In scores of developments visited this past year the duct work required was within the $100 to $130 bracket (including registers and grilles, dampers, and plenum.

It has been noticable that the builders have gone to more pains to place the furnace where duct work is minimized than the heating contractor has taken to eliminate unnecessary metal work. Of course this is excusable because we make more money with more metal; none-theless it does seem as though the successful contractors in new house work are those willing to investigate and try new ideas. What is needed is more contractors willing to try new ideas.

One feature of these systems which has impressed us is the persistence with which contractors hold to established ideas on the number and location of returns. We have seen numerous installations lately where a return was placed in each room of a four or five room one story house at considerable extra cost just because the heating contractor had always used one return per room in the larger houses we used to build.

Perhaps one return per room is good practice, but we suspect that such practice can be curtailed in the scheme of the small house. There is much data to support the satisfaction of even one return—certainly two returns for these small

(*Continued on page* 106)

Materials Consumed in Home Building

Our industry, both heating and sheet metal, is concerned right now with the problem of having allotted to us enough material to meet our needs in the present boom era. How much material we need for new house construction has been a controversial question. These figures from an FHA study produce the necessary data—plus some facts on owner and builder preferences.

Table 1—Estimate of Quantities of Metals Used in 1,000 Single-family Detached Houses Under Normal Conditions[1]

	Structure	Heating	Plumbing	Electric Wiring	Total
	Pounds	Pounds	Pounds	Pounds	Pounds
Iron and steel	1,668,621	1,181,857	1,600,065	84,575	4,535,118
Copper	48,389	12,221	94,940	28,746	184,296
Zinc	37,954	18,102	32,756	5,729	94,541
Lead	173	2,842	84,863	.....	87,878
Tin	258	927	991	510	2,686
Aluminum	284	563	253	.....	1,100
Monel	.....	.....	756	.....	756
Nickel	18	7	258	.....	285

Note.—In addition to the above metals, a small amount of cadmium and insignificant amounts of antimony, chromium, manganese, mercury, and molybdenum are used.

[1]The use of metals in housing produced during the National Emergency can be reduced sharply by elimination of and substitution for critical materials.

A DETAILED study of the types and quantities of materials entering into the construction of single-family detached houses has been undertaken by the Federal Housing Administration's Technical Division and its Division of Research and Statistics.

The data being established by the study are of particular interest at this time in view of the increasing importance of questions relating to raw material supply during a period of sharply expanding defense production and the uncertainty as to the amounts of materials consumed in residential construction which also are in demand for armament purposes.

Estimates have now been compiled on the amount of metals used in single-family home construction, expressed in terms of quantities consumed in the construction of 1,000 average single-family houses.

The accompanying Table 1 shows the estimated quantity of metals used in the production of 1,000 single-family detached houses and also lists separate estimates for the four major construction classifications. The quantities shown include an approximation of the metal content of certain types of shop-assembled equipment and accessories, which vary considerably in weight and in proportioning of metals depending upon the practice of different manufacturers. The estimated quantities shown in the table exclude certain types of construction external to the house, such as garages, porches, stoops, terraces, and septic tanks, as well as certain equipment items which are being analyzed in a separate study.

Preliminary findings indicate that by use of substitute materials in the structure of new houses wherever possible, by temporarily eliminating extra bathrooms, and by minor plumbing changes, average metal requirements per house could, in the case of most metals, show such reductions as 9 per cent in iron and steel, 31 per cent in copper, and 100 per cent in Monel.

In each city a percentage distribution for each design characteristic was calculated from the number of cases in the sample. The percentages were then weighted by the proportion that the volume of new homes started in the particular office bears to the total for the entire country and weighted averages computed for each of the design characeristics.

There are presented below some of the major design characteristics and the percentage distribution of the individual items:

Further analyses were made involving the type of materials entering into construction of residential buildings with stress being laid on the metals being used. The following tables present the types of materials used in interior and exterior residential construction:

Design Characteristics of FHA Insured Houses

Item	Percent Distribution
1. Basements:	
Full	55.03
Partial	14.20
None	30.77
Total	100.00
3. Gutters and downspouts.	
Included	72.98
None	27.02
Total	100.00
8. Heating:	
Distribution method:	
Warm air system:	
Gravity	23.52
Forced	18.99
Pipeless furnace	.74
Floor furnace	21.60
Space heater	9.96
Stoves	2.21
Total	77.02
Hot water system:	
Gravity	7.44
Forced	4.76
Total	12.20
Steam system	8.71
None	2.07
Grand Total	100.00
Firing method:	
Manual:	
Coal or wood	37.41
Oil space heater	.20
Gas space heater	9.79
Gas floor furnace	21.60
Gas radiant heater	.16
Total	69.16
Automatic.	
Coal stoker	1.31
Oil, central system	13.13
Gas, central system	16.40
Total	30.84
Grand Total	100.00

Types of Materials Used in Residential Construction Exterior

	Percent Distribution
1. Exterior Walls:	
Frame with brick or stone veneer	20.58
Frame with wood siding or shingles	42.55
Frame with asbestos side or shingles	3.19
Frame with stucco	15.43
Masonry with brick or stone face	10.17
Masonry with cinder or concrete block	.56
Other types	7.52
Total	100.00
2. Roofing:	
Built up	5.07
Composition shingles	47.40
Wood shingles	35.60
Slate, tile or asbestos shingles	11.09
Galvanized iron	.22
Tin	.10
Other types	.52
Total	100.00
3. Gutters and downspouts:	
Galvanized iron	83.01
Copper	9.13
Wood gutters—copper downspouts	7.86
Total	100.00
6. Type of material in Termite protection:	
Copper shields	32.67
Galvanized iron shields	29.37
Treated lumber shields	37.96
Total	100.00
12. Insulation:	
Roof or ceiling:	
Metal	1.09
Other	24.20
None	74.71
Total	100.00
Walls:	
Metal	1.05
Other	8.91
None	90.04
Total	100.00
16. Heating:	
Furnaces:	
Steel	70.56
Cast iron	29.44
Total	100.00

SPAB Orders Compilation of All U. S. Needs

DETAILED planning of America's defense program on a basis of accurate, coordinated knowledge of all of the Nation's requirements, both military and civilian, was launched September 10 by the Supply Priorities and Allocations Board. SPAB ordered compilation of full schedules of both military and civilian requirements as far in advance as possible.

The compiling of the Nation's requirement schedules will call for:

1. A detailed outlining of both civilian and military needs, including procurement schedules for Army, Navy, and Air Force items, and including also such goods as are to go abroad under the Lend-Lease and Defense Aid programs.

2. Both the military production schedules and the statements of civilian requirements are to be broken down into schedules of the raw materials, labor and machinery needed for their production.

In calling for this long-range, all-inclusive survey of the Nation's total needs under the defense program, SPAB followed the view that there must be one authority to develop the official requirement figures on both levels, holding that there would be confusion otherwise, because the several parts of the requirement picture must be developed by separate agencies.

Defense Developments

Plumbing and Heating Advisory Committee

FORMATION of a plumbing and heating defense industry advisory committee was announced October 27 by the Bureau of Clearance of Defense Industry Advisory Committees, OPM. Members are:

George Hoffman, manager, Plumbing Division Crane Co., Chicago; William M. Byrd, vice president, Alabama Pipe Co., Anniston, Ala.; E. S. White, president, U. S. Radiator Corp., Detroit; W. L. McGrath, vice president, Williamson Heater Co., Cincinnati; E. C. Sammons, vice president, Iron Fireman Co., Portland, Oreg.; J. A. Doucett, vice president, Revere Copper & Brass, Inc., New York, N. Y.; R. L. O'Brien, president, Detroit Brass and Malleable Co., Detroit; O. L. Swats, assistant sales manager, Grinnell Co., Inc., Providence, R. I.; M. W. Dennison, trustee, Braman Dow & Co., Boston, Mass.; L. F. Hudepohl, president, T. S Conner, Inc, Cincinnati; H. M. Reed, president, American Radiator and Standard Sanitary Corp., New York, N. Y.; Charles D. Wessells, president, D. D. Wessells & Sons Co., Detroit; M. F. May, vice president, Young Radiator Co., Racine, Wis.; Frank C. Packer, assistant to president, Payne Furnace & Supply Co., Beverly Hills, Calif.; Harold Sweatt, president, Minneapolis-Honeywell Regulator Co., Minneapolis; N. H. Wiewel, assistant, general sales manager. Jones & Laughlin Steel Co., Pittsburgh; R. L. Stewart, vice president, Stockham Pipe & Fittings Co., Birmingham, Ala.; G. E. Mumma, assistant supervisor, Plumbing and Heating Division, Sears Roebuck & Co., Chicago; and Edward Costello, Costello Engineering Co., Washington, D. C.

◆

Oil Burners Restored to "Good Standing" for Defense Homes

IN amendments effective November 15 to the Defense Housing Critical List and to Interpretation No. 1 of this list, the Priorities Division restored to good standing the use of oil burners in defense-housing construction on the Eastern Seaboard.

Because of the petroleum shortage existing at the time the original critical list was issued, the acquisition of oil burners for defense-housing units in certain Eastern States was not assigned the priority assistance applicable to other building materials.

◆

SPAB, OPM order Allocates All Critical Materials

PREPARATION for the allocation of all critical materials throughout American industry was called for November 7 in parallel actions by the Supply Priorities and Allocations Board and the Office of Production Management.

SPAB laid down the principle that where feasible the allocation programs should be developed in such a way that minimum quantities of the needed materials would be assured to essential industries whose operations are curtailed.

In substance, the development of an allocation program will proceed roughly as follows:

An industrial branch in OPM takes the first step, calling on its several sections to develop requirements programs for each industry which manufactures the products for which the branch is responsible.

Each program is built up by the branch or by its section, through consultation with the Industry Advisory Committee involved and also through discussion with either or both of the Armed Services, depending on the nature of the product and the materials used in its manufacture.

When this has been done, the officers of the industrial branch who have the program in charge discuss the entire matter with the industrial branches which have jurisdiction over the materials or the products out of which the article in question is made. Agreement is reached between the branches as to the amount of material which can be allocated, etc.

Each program would originate with the group which is responsible for the end product, with the raw materials groups coming into the picture in an advisory and consultative capacity. Since all programs must of necessity be decreased or increased as armament production rises, each one will be framed so that it can be modified upward or downward in case of need. When a program has been drawn up, it will be reviewed carefully in order to cut down the use of critical maerials to the greatest possible extent through simplification of lines, substitution, and so on. The OPM Bureau of Industrial Conservation will work with and through the industrial branches to accomplish this.

When the program drawn up along these lines has been agreed upon by the branches involved, it will be presented to the executive director of SPAB, in order that it may be properly synchronized with other programs.

After SPAB has passed on a program—the program is referred to the OPM Priorities Division, which undertakes to make it effective and, where possible, to make sure that the needed quantities of goods will in fact be available, through the issuance of the required priorities ratings or through allocation of materials.

◆

New Field Offices CDD

FIELD offices of the Contract Distribution Division of OPM to help qualified manufacturers get defense work have been opened in four additional cities:

Chattanooga, Tenn.—909-910 James Building.

Fall River, Mass.—27 South Main Street.

Lancaster, Pa.—655 Woolworth Building.

Wilkes-Barre, Pa.—528 Miners National Bank Building.

This brings the total of Contract Distribution field offices to 62.

Copper Restraining Order Postponed to Jan. 1

THE restriction against the use of copper sheet, strip and screen in building construction was eased November 5, by the Division of Priorities.

Due to go into effect November 1, the restriction would have "frozen" stocks of already fabricated materials in the hands of manufacturers, distributors and consumers. Because of this, the restriction is revoked and copper sheet, strip and screening may be manufactured at a reduced rate and used until January 1, 1942, after which their manufacture is prohibited under the general terms of Copper Conservation Order M-9-c.

A number of changes, largely for clarification, were made in the Order by the series of announced amendments. They are:

1. Paragraph (b) which prohibits the use of copper sheet, strip and screen in building construction after November 1 is revoked and these articles are placed on List A of the Order, which curtails their manufacture until January 1, 1942, and prohibits their manufacture thereafter.

2. The word, "and hospitals" are added after "research laboratories" in subparagraph (5) of the general exceptions so that hospitals may use copper where physical and chemical actions make the use of other materials impractical.

3. A new subparagraph (8) is added to the general exceptions to the Order. It reads: "For use for repair or replacement purposes in plants employing chemical processes and in plants processing food where the existing installation is copper or copper alloy and where and to the extent that chemical action makes the use of any other material impractical."

4. Manufacturers of articles not on List A, were permitted to use substantially 70 per cent of the copper used by them in the manufacture of each such article in a 1940 base period. Such a manufacturer is now permitted as an alternative to use "50 per cent of the total amount of copper or copper alloy respectively used by him in the manufacture of such article during the period between July 1 and September 30, 1941," plus the amount of copper necessary to manufacture articles under the exceptions. This will assist a defense industry which is operating at a higher rate than in 1940, but still requires a drastic conservation in the use of copper.

By the amendment, a manufacturer who holds a blanket preference rating order of A-2 or higher (as distinguished from a preference rating certificate) is relieved from the curtailment provision which applies to all articles not on List A—insofar as he is manufacturing articles within the provisions of the blanket preference rating.

5. The paragraph relating to the limitation of inventories is amended to include scrap.

Further amendments are changes in List A, which prohibits the use of copper in certain articles after January 1, 1942.

The prohibition on air conditioning equipment is amended as follows: "except for essential food storage and transportation and industrial processing where the use of other material is impractical."

Under the heading of plumbing and heating supplies, the phrase "convectors and local heaters" is changed to read "convectors, local and unit heaters (except heat controls)."

In the field of household appliances, heaters are changed to "portable heaters" and an exception is made for heat controls on stoves and ranges.

◆

Appeal Form PD-167 Provided fro Copper Hardship Cases

A SPECIAL appeal form has been provided for manufacturers whose operations come under the special hardship clause of Copper Conservation Order M-9-c.

The new form, PD-167, may be obtained from any Priorities Division field office or by writing to the Priorities Division in Washington. Any appeal made must be filed on this form and must be mailed to the Director of Priorities, Reference M-9-c, Washington, D. C.

In considering appeals, the Priorities Division will take account of such factors as sudden and harmful dislocations of employment and freezing of inventories which are in process and which would become useless if the process were not completed.

◆

Small Plants Hold "Balance of Power"

SMALL plants, employing more than 60 percent of all our industrial workers, "represent the balance of power in the World conflict," Floyd B. Odlum, Director of the OPM Contract Distribution Division, said recently.

"We will make a vigorous effort to see that no large order goes to any firm that does not agree to 'farm out' a reasonable part of the work," Mr. Odlum promised.

Excerpts follow:

. . . The big mass production high-speed plants are fine. To play safe against long-range demands or for particular kinds of work we may have to build even more. But our machine-tool industry will work to capacity for another eighteen months to equip what we now have projected. We must not overlook what already exists. We can increase production quicker by converting our existing factories, large and small, to defense production.

We should and must do this for another reason, too. Thousands of these plants face the prospect of curtailment or closing unless they can be converted quickly to defense production. Some authorities estimate that 2,000,000 jobs are at stake.

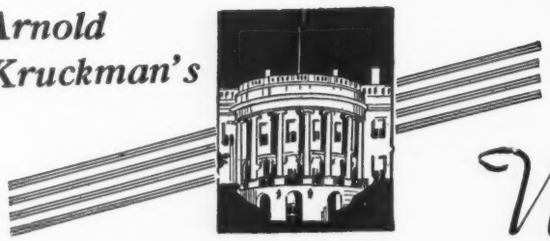
You are all probably familiar with the well publicized fact that 75 percent of the initial major defense contracts went to 56 big companies. That does not tell the whole story, of course, for many of these prime contractors worked with hundreds of subcontractors. But nevertheless it is true that most of the work is in a comparatively few companies.

But the picture has changed. The problem is different today. Price is not the main yardstick. Speed in deliveries is more important. We must spread the work and do it now—immediately.

It is my firm belief that our small plants of America represent the balance of power in the World conflict. Those with 500 or less employees account for more than 60 percent of all our industrial workers.

Large orders are already being broken into smaller ones when feasible. New plants will not be fostered when presently existing ones are known that can effectively do the same job in the same or shorter time.

Arnold Kruckman's



Washington Letter

Progress of the Rehabilitation Program

IN 37 States, one Territory, and in the District of Columbia, there are 254 defense areas, designated by the Federal Government as entitled to building materials under a Defense Priority. Repairing, rehabilitation, remodeling, in defense housing areas, is given preference in priority rating over all new building projects because remodeling, etc., is swifter and cheaper.

The priority is issued to the contractor and if the owner does the job himself by force account, or equivalent, the owner gets the priority and passes the same rating along to all those who have anything to do with the rehabilitation. Thus, the heating contractor would get the priority rating and would pass the same rating along to those who supply him with equipment, materials, services.

The rating changes with the urgency of the need for housing in a given community. Usually, the same rating is given to all the projects in a given community. The lowest rating is A-8, the highest is A-2 and the ratings usually are up near the A-2 preference. This means, of course, a relatively easy time getting equipment and materials for rehabilitation of large old homes for accommodation of defense workers.

Extent of the Market

All Federal agencies, emergency or permanent, concerned with defense housing earnestly wish that large old houses, and other old houses, in these areas be remodeled, rehabilitated, or otherwise changed to be useful to more families or individuals. A careful canvass of Government agencies in Washington reveals that no survey has yet been made which accurately reveals how many houses in these areas may be fixed up. It is known, however, that in the Defense areas there are 14,815,321 homes or residential houses which should be rehabilitated in some degree.

Most of these buildings are private residences, in varying stages of deterioration. All of them are in the category which enables their owners or lessees to obtain defense improvement priority ratings from OPM. And all of them are eligible to Title 1 loans for rehabilitation by Federal Housing Administration, and probably will be able to secure financial assistance from other agencies. All of them may secure materials, including heating equipment, ducts, roofing and similar metal improvements, under one of the A ratings that apply to Defense work.

The older structures in the 37 States, the Territory and the District, are especially mentioned here because they are eligible to installation of heating equipment. As a matter of fact, the other 11 States, with probably more than another hundred Defense Housing areas, also have a great number of old houses that may be rehabilitated. But this group is omitted from this discussion because, generally speaking, they do not use heating equipment to the extent that such equipment is required in the homes that are found in the 37 states. This should not be interpreted to mean, however, that heating equipment is not, sometimes, installed in the old houses in the 11 States.

Title 1, administered by Federal Housing Administration for defense housing rehabilitation, in its amplified form, has only been in effect since September. It has only recently started to move, and the results to date can scarcely be taken as a true indication of public interest. The daily volume of loans under Title 1, at this writing, average $1,000,000.

Accomplishments To Date

Assistant Administrator Jones states that thus far the bulk of the loans have been insured in the industrial areas of the Northeastern section of the United States. Mr. Jones says it is rather surprising that the Defense housing areas in the industrial Middle West apparently have not yet awakened to the fact that they may use Title 1 to secure insurance for rehabilitation loans. Apparently FHA and other Government agencies stand quite ready to cooperate with any firm or any group of industrial units which wish to put on a campaign to induce the owners or occupants of large old houses to make improvements that will make more living space available to shelter Defense workers, and others, in Defense areas.

The average loan for rehabilitation amounts to $2,500. The large old house that is rehabilitated usually is changed to shelter 4 families, instead of one or two. In the majority of cases the houses have some gravity warm air heating, although frequently the houses are found to have steam or hot water heating equipment. Usually, although there is no firm data to govern, the warm air gravity equipment is rehabilitated to place forced warm air heating systems in operation.

The average sum expended on rehabilitation of the heating system amounts to $480 per house in a total over-all rehabilitation cost of $2,500. FHA finds that the percentage of 15.6 runs true as an average in all rehabilitation expenditures for heating equipment. It figures that the present $1,000,000 per day loan average carries an average of $156,000 for heating plants and equipment.

The Home Owners Loan Corporation, which has made a specialty of rehabilitation of old houses "across

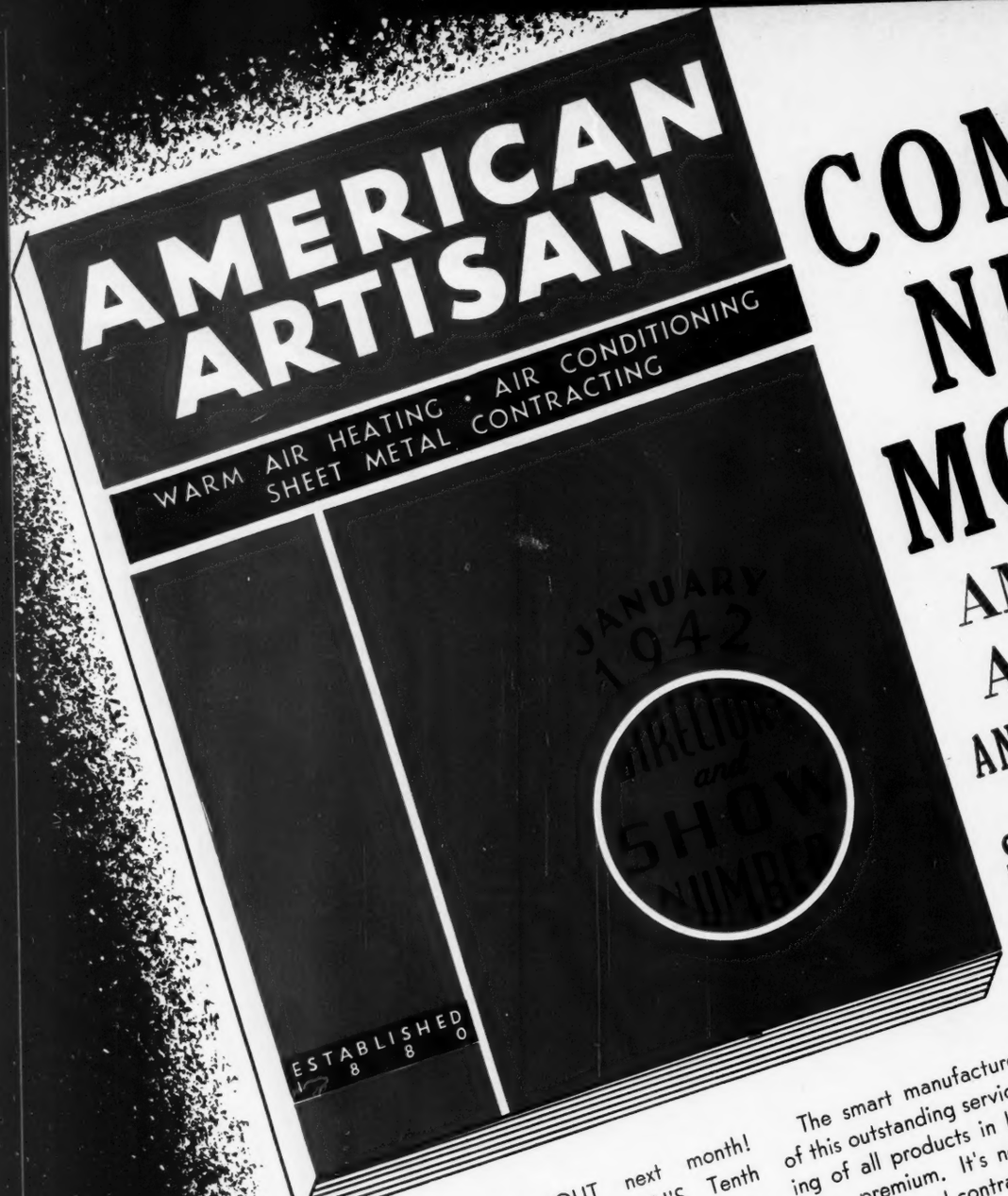
(*Continued on page* 100)

AMERICAN ARTISAN

RESIDENTIAL AIR CONDITIONING

SECTION

DEVOTED TO HOME AND SMALL COMMERCIAL AIR CONDITIONING



COMING NEXT MONTH!

AMERICAN ARTISAN'S ANNUAL DIRECTORY and SHOW NUMBER

It WILL BE OUT next month! AMERICAN ARTISAN'S Tenth Annual Directory and Show Number carrying the industry's original, reliable, complete classifications of "who makes it" and "where are they located?" . . . In addition, it will contain the Show Section of the International Heating and Ventilating Exposition at Philadelphia, complete with all listings and directions of what is to be displayed at the Show and where to find it. It's a real advertising buy for every manufacturer. It offers advertising that lives **all year.** A chance to reach the 9,000 readers and BUYERS with a message that packs a full-year advertising campaign wallop . . . **and at the regular issue rates!**

The smart manufacturer can take advantage of this outstanding service by making a full showing of all products in large space without paying a premium. It's nothing to overlook! 9,000 key dealers and contractors aren't so easily available in any other way.

No regular editorial space will be sacrificed for the sake of the Directory Section in this January Issue. Our editors are as usual selecting a group of outstanding and permanently valuable articles on residential air conditioning, warm air heating and sheet metal contracting subjects that will make this Directory number as much a reference book from an article standpoint as it will from that of product specification and purchase. Don't delay! Send in your order now for liberal space to show your entire line.

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Here is a monthly issue—and it comes only ONCE a year—in which your advertising lives ALL YEAR. After they have studied its many articles and data dealing with current problems, thousands of contractors and wholesalers will preserve the January 1942 issue for eleven months more . . . to use as a buying and specifying guide. Many will turn to the advertising pages seeking additional information about your products after finding them listed in the Directory Section. Make it easier for them to order from you—make a full showing of your line. SPACE RATES THE SAME AS FOR ANY OTHER ISSUE.

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6 North Michigan Avenue

Drying Packaged Fuel

By Alfred R. Wagstaff

Engineer, Sioux City Fdry. and Boiler Co., Sioux City, Iowa

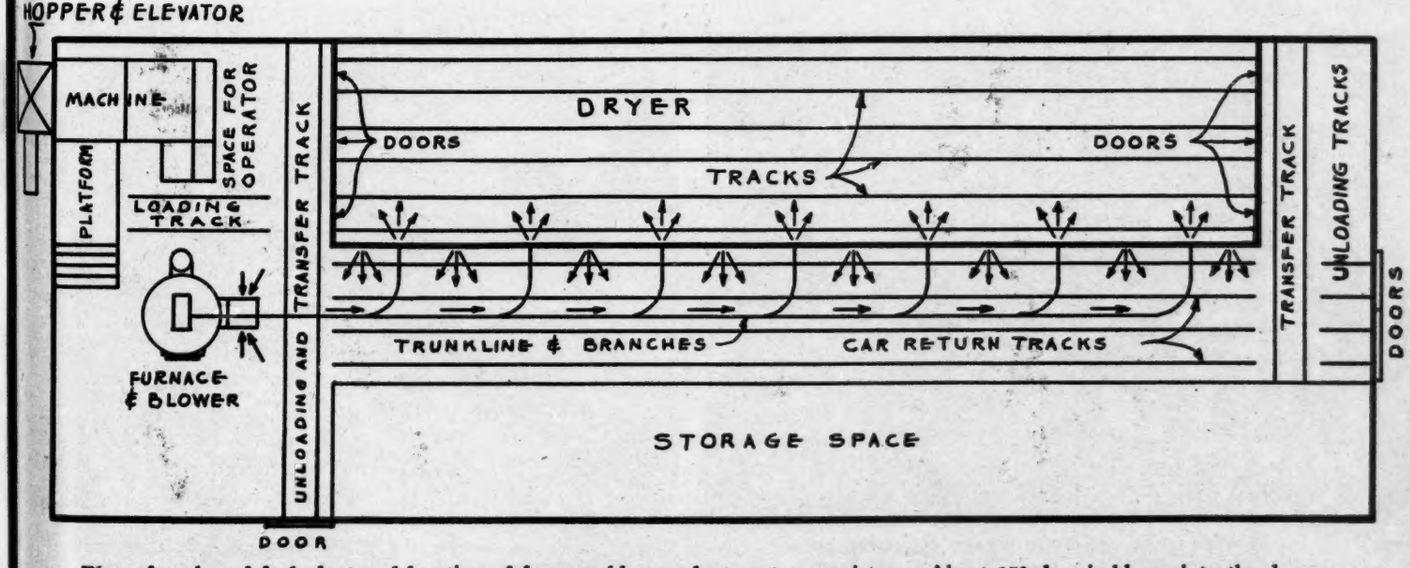
THE drying of packaged fuel is somewhat different from the drying of other commodities because the powdered fuel, after being prepared, is pressed into cubes, wrapped in 50-lb. Kraft paper, sealed with tape and then dried. If the drying could be effected after the cubes are delivered by the pressing machine and before being wrapped and sealed, the drying would be simpler.

The dryer described is operated by the Edwards and Browne Coal Company of Sioux City, Iowa, and is arranged as shown in the drawing. The powdered fuel, either coke or semi-anthracite coal, is elevated into a hopper alongside and above the mixing and pressing machine, where it is in readiness for use in the machine.

Preparing the Fuel for Drying

The machine used to prepare the package fuel is comprised of the measuring hopper, the mixing hopper and the press, attached to which is the wrapping mechanism, as in Fig. 1. When the machine is in operation about 400 pounds of fuel is dropped into the measuring hopper. From here it is dropped into the mixing hopper where circular mixing knives continually mix the batch. During the mixing a corn product binder, similar to corn starch, and water are added in definite proportions. After being thoroughly mixed the batch is dropped into the hopper which feeds the press.

An electric motor operates the press, depositing three 3-inch cubes of fuel at each operation. When six cubes have been deposited, as shown in Fig. 2, they are slid to the left onto a piece of 50-lb. kraft paper, and by means of a lever, the paper is folded around the cubes. A long piece of moistened gummed tape is then placed over the edges of the paper, sealing the package. This package contains approximately ten pounds of fuel plus the moisture. The cars used to hold and convey the packages of fuel are placed alongside the machine so that the operator can load as the packages are taken from the machine. The packages of fuel are placed on wooden racks on the car, with spaces between for air circulation, the second and fourth layers resting on the first and third. The third layer rests on a steel frame securely fastened to the frame of the car. This is to keep the excessive weight off the newly made packages of fuel. Each car holds 200 packages or a ton of fuel. After a car is loaded it is pushed onto a transfer car or truck which has two rails at right angles to the wheels. This transfer car



Plan of packaged fuel plant and location of furnace, blower, duct system, registers. Air at 150 deg. is blown into the dryer and exhausts into storage room.

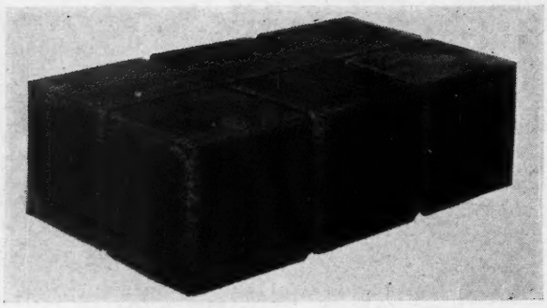


Fig. 2—A "package" consists of six cubes of pressed and dried fuel.

is pushed even with the track being filled in the dryer and the car of fuel pushed into the dryer.

The dryer proper is a room built within a corrugated iron building which houses the equipment and covers the storage space. This drying room is regular framing, Fig. 4, having exposed wall and roof well insulated and is sheathed on the inside with ½-inch paper board which is covered on both sides with aluminum, Fig. 5. There are three tracks lengthwise of the dryer, each track is long enough to hold twelve loaded cars or eight hours' run of the machine, as one and one-half tons is the hourly capacity of the machine.

Drying Equipment and Spaces

The drying is continuous, the freshly made packages of fuel entering the dryer opposite the machine and the dried packages being taken out of the other end. A transfer car is used at each end of the dryer.

From the drawing you will see that the machine, the furnace and the blower are at one end of the building, with a trunk line off the top of the furnace. The tracks outside the dryer are for storing cars of dried fuel or for returning cars

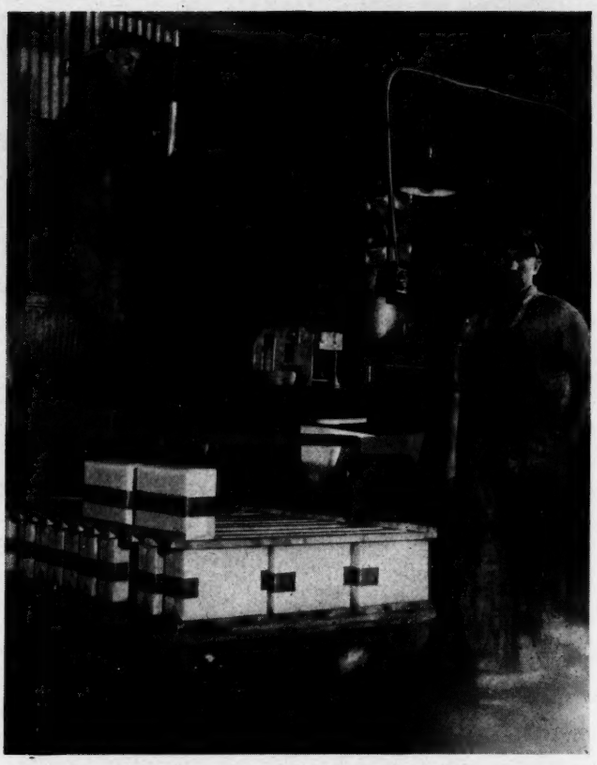


Fig. 1—Mixing and pressing machine with a partly filled car in the foreground. Coal, water and binder are mixed in the machine and the "package" wrapped as shown.

which have been emptied, back to the machine for re-loading. After the fuel is dried and awaiting delivery, the packages are stored in the storage space, Fig. 6. The heated air is delivered into the dryer at the top and the exhaust openings are cut in the same wall in the alternate panels.

The drying equipment was installed by the Norfolk Furnace Company of Sioux City, Iowa, after the dryer and building had been completed and the only way to dispose of the moist return air from the dryer was to empty it into the storage space.

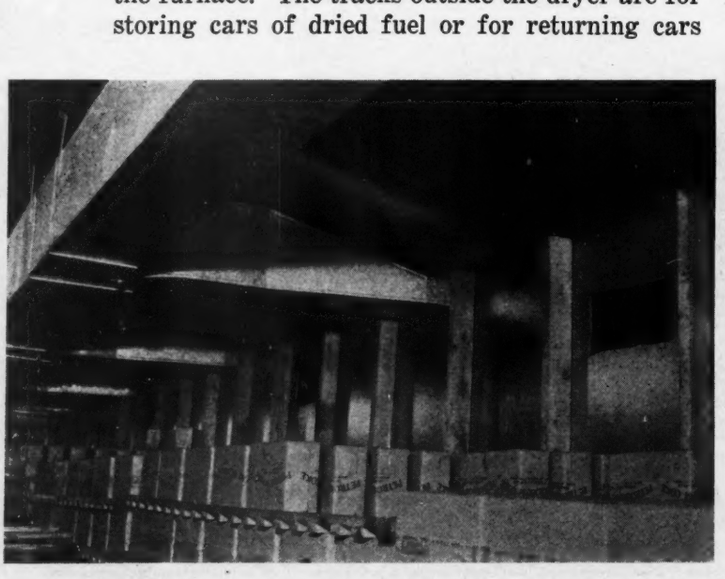


Fig. 4—Trunkline and branches for delivering air to dryer and openings through which air from dryer escapes into storage space. Fuel shown has been dried and is in storage.

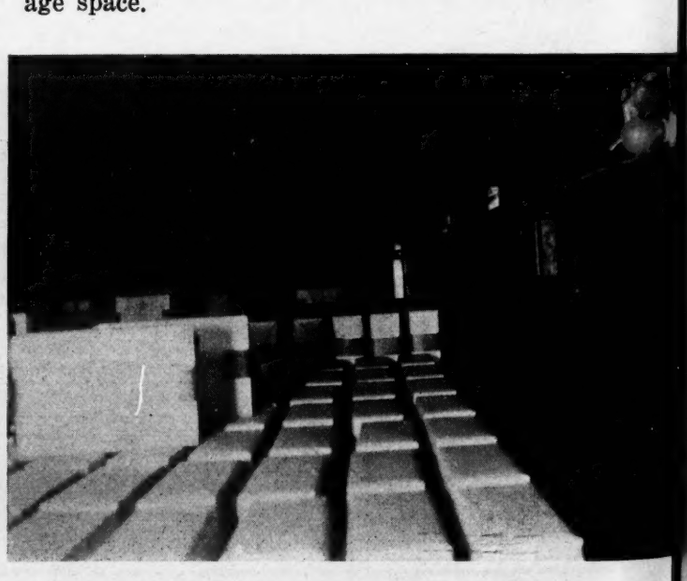


Fig. 5—Inside the dryer showing deflectors over registers (upper right) and exhaust openings in same wall. (See photograph at the left). Reflective insulation used to conserve heat.

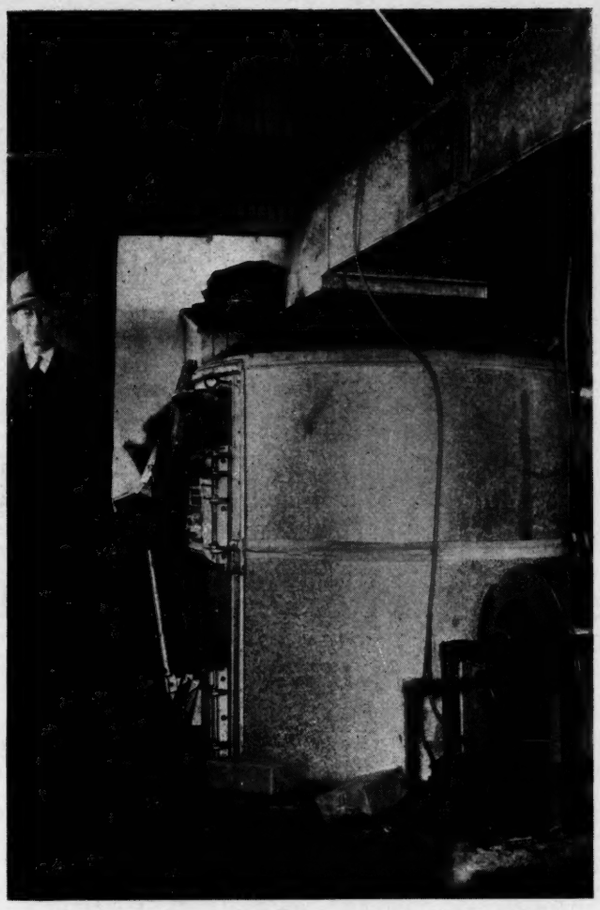


Fig. 3—Furnace and blower as completed. Compare with plan on first page.

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Design of Drying System

The heat and air delivery into a dryer should compensate for the heat loss of the dryer itself, the heating up of the material to be dried and the cars conveying packages, the latent heat for evaporation and air necessary to carry this heat. In this particular installation, the heat loss of the dryer, the latent heat for evaporation and the pick up load for the fuel and cars, amounted to 295,700 Btu per hour using 150° F. entering air and 70° F. exhaust air. The furnace and blower were sized accordingly. In order to deliver the air evenly a trunk line and seven inlets each 14 x 4, having a total area of 392 square inches were installed. Eight 15 x 7 exhaust openings having an area of 840 square inches were cut in the inside wall opening into the storage space. This allows the warm air to travel under the trunk line and reduce the delivery loss. Windows above the storage space are left open so that the moist air can exhaust and fresh air enter.

In preparing the fuel for pressing, from one to two and one-half gallons of water are added to each batch of 400 pounds, according to the fineness of the fuel. This makes necessary the removal of from 41¾ to 104½ pounds of moisture per ton, or approximately 1000 pounds for a day's run of 12 tons, or 6.4 oz. of moisture per package.

Results of Check Tests

Complete tests were made on several occasions and the anemometer readings showed the air delivery into the dryer to be 2,873 Cfm with temperature readings from 155° F. at the first register to 126° F. at the last register; exhaust temperatures from 86° F. at the second opening to 92° F. at the last opening. The velocity in the main duct from the furnace was 1,326 Fpm while the register velocity into the dryer was 1,055 Fpm. With the delivery of 2,873 Cfm, there were 42½ air changes per hour in the dryer, the dimensions of which are 12 feet wide, 56 feet long and an average of six feet high, as it has a sloping roof. The moisture pick up of the air is shown in two tests:

Test No. 1

Exhaust	88°	38%Rh	5.358 Gr. Cu. Ft.
Fan inlet	74°	29%Rh	2.658 Gr. Cu. Ft.
Difference			2.700 Gr. Cu. Ft.

$$\frac{2.7 \times 2873 \times 60}{7000} = 66.5 \text{ lbs. per hr.}$$

or approximately 15 hours to remove the moisture added.

Test No. 2

Exhaust	90°	30%Rh	4.48 Gr. Cu. Ft.
Fan inlet	70°	21%Rh	1.69 Gr. Cu. Ft.
Difference			2.79 Gr. Cu. Ft.

$$\frac{2.79 \times 2873 \times 60}{7000} = 68.7 \text{ lbs. per hr.}$$

(*Continued on page 67*)

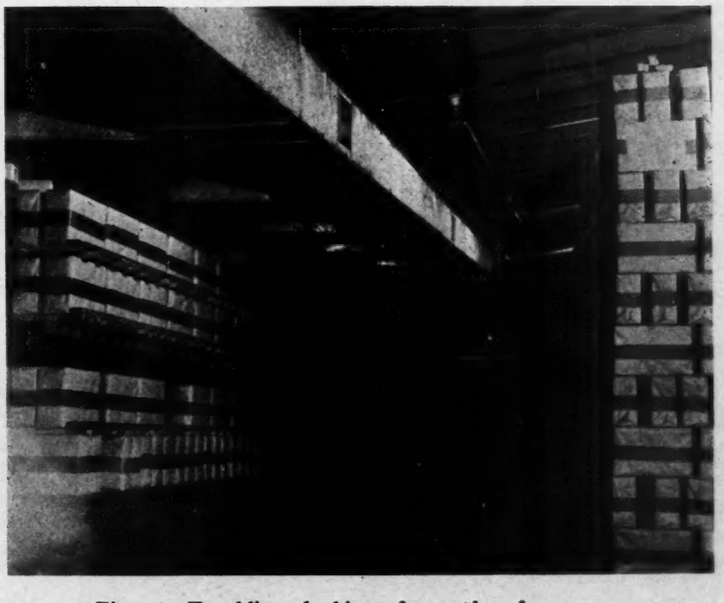
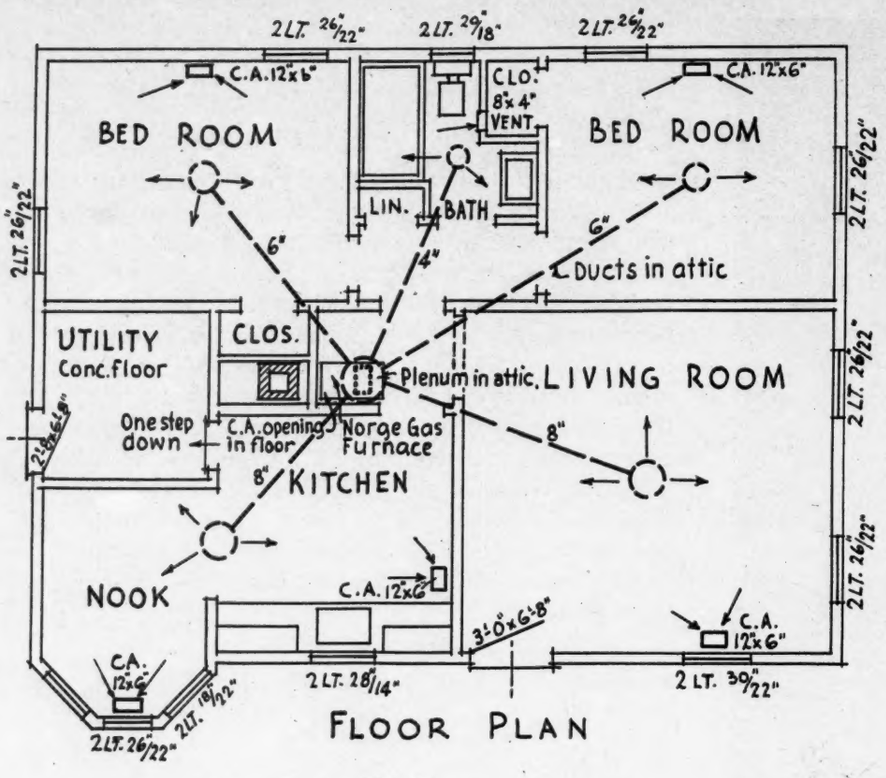


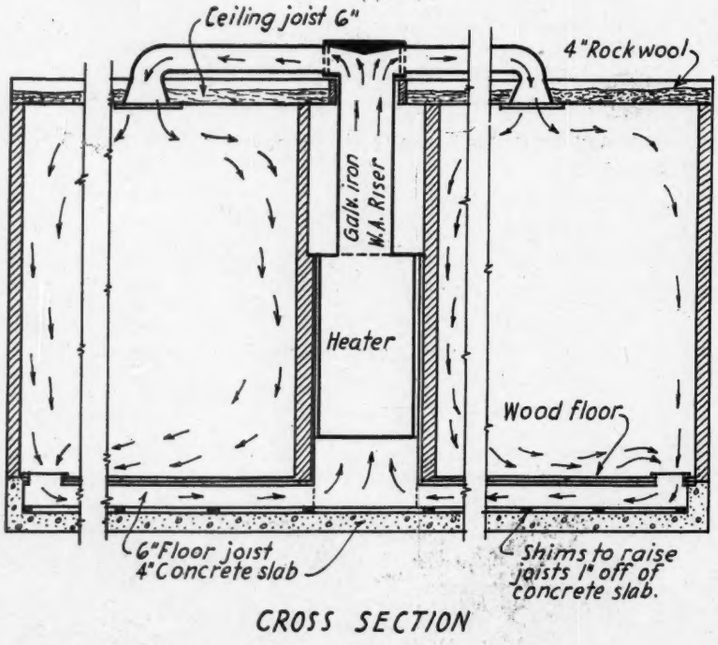
Fig. 6—Trunkline looking from the furnace. Branches to dryer at upper left. Fuel on cars and piled waiting delivery.

Floor-Slab C. A. Plenum Plus Attic Supply Reduces Piping

[Defense Heating]



FLOOR PLAN

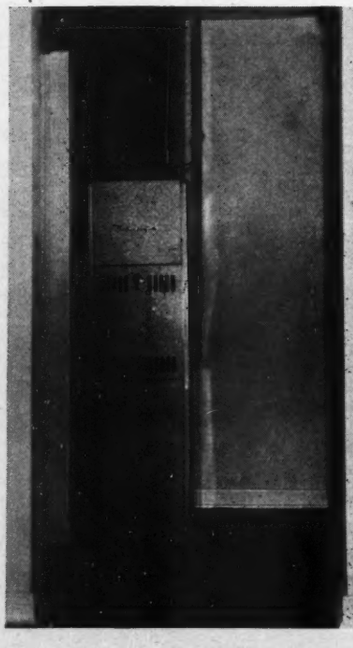


CROSS SECTION

IN Fort Wayne, Indiana, the L. C. Smith Building Company is erecting small, low cost, two bedroom homes in a defense housing project. The houses have no basement. A full concrete slab is laid under the house. All rooms are on the ground floor.

The unusual feature of these houses is the design of the warm air heating system. The idea was developed by heating contractor Charles E. Tharp & Son of Fort Wayne working with the builder.

In this system the floor joists are held off the concrete slab by small stone or slate blocks so that the lower edge of the joist is approximately one inch above the slab. The blocks are placed at close enough intervals to prevent any sagging in the joist—usually on about two-foot centers. The result is a full cold air floor plenum with a one inch space under all joists for air to circulate. Cold air enters the slab-floor plenum through



The plan, cross section and photographs show a forced air Norge gas furnace in a house where the floor-slab space is used as a return air plenum. Note how joists are held off the slab and location of C.A. grilles. High velocity diffusers are placed near the center of each room. Attic pipes are insulated. For results see text.

These photographs and the plan show the floor-slab return air plenum used with a gravity furnace. Usually two grilles admit air to the plenum and one C.A. grille takes air directly off the floor. Floor registers are used for warm air.

cold air grilles placed near outside walls (see plan).

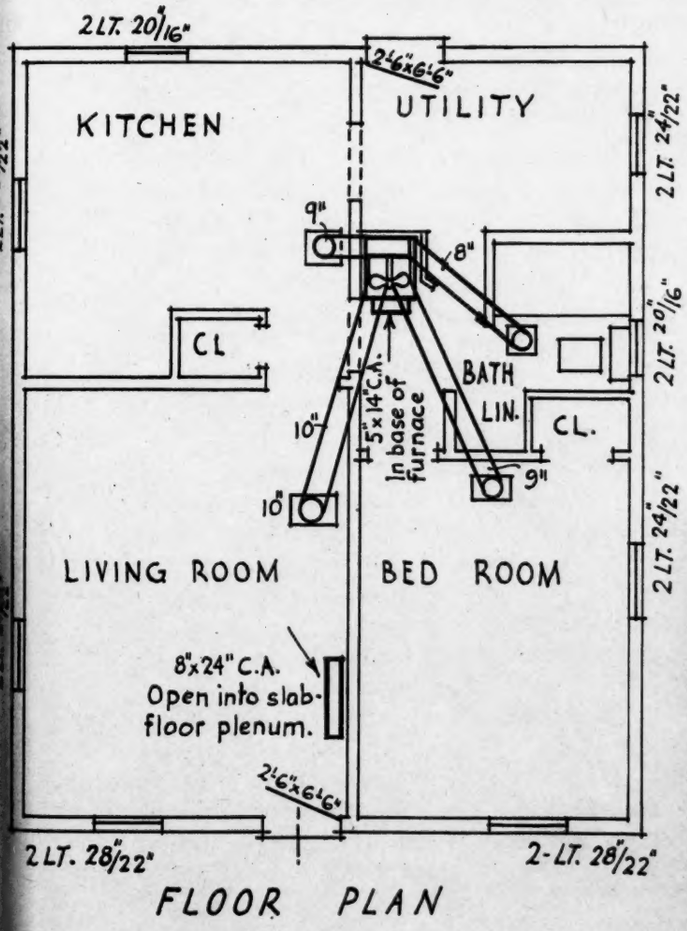
The furnace, either gravity or forced air, is located in the approximate center of the house, usually in a small alcove (see photograph) at the end of the hall. The bottom of the furnace is open to the cold air plenum (see elevation) so, to save space and because the heat loss is low, the upright type of furnace is being used.

The warm air side of these installations is also interesting. The plenum is carried straight up into the attic ending in a drum shaped distributor from which round pipe supplies are carried straight across the unused attic to the elbow which turns down to the registers. A departure from usual practice is being tried in the forced air installations wherein high velocity diffusers of the concentric ring type are placed in the ceiling (see photograph and floor plan) about the center of the room. A sufficiently high velocity is maintained through the warm air pipe and diffuser to obtain full throw of the warm air to outside walls.

Practically the same design is used in the gravity furnace installations except that cold air is not dropped into the slab-floor plenum from every room, but through one or two grilles placed in the rooms of major importance. In addition, a cold air grille into the base of the furnace takes air directly off the floor of the hall (see plan) and the proportion is about two-thirds air from the slab-floor plenum and one-third directly off the floor. To prevent infiltration into the slab-floor plenum, the foundation is carefully caulked and grouted.

Also, in the gravity installations the high velocity diffusers are replaced by floor type warm air registers and the registers are not placed in the center of the ceiling, but adjacent to inside corners. This location and the type of register is shown in one photograph and on the floor plan. The principle involved is not distribution through

(*Continued on page* 53)



FLOOR PLAN

Repair, Replace, Recondition—

To Meet Defense Problems

Of all the headaches which face the furnace dealer, none, perhaps, is so aggravating as the complaints which arise from poor firing methods. It's easy to pass the buck to the fuel dealer—to say he should instruct his user in firing methods—yet the fact remains that poor firing condemns the furnace in the minds of many users. Better, therefore, to be prepared to offer a short course in firing. A firing chart is a great help—we know none better than the Bituminous Coal Chart of the Consumers Counsel, Department of Interior, Box 483, Washington, D. C., from which most of these illustrations are taken.

Catechism of Proper Firing Methods

By S. Konzo
Special Research Associate Professor
Engineering Experiment Station, University of Illinois

HAVE you ever had a home-owner question you about coal? Has he ever asked you how he should operate his furnace for maximum economy? Have you ever recommended any one of a dozen practical tips that might assist him? If you aren't continually besieged with such inquiries you are not living the normal existence of a heating contractor.

In the following questions and answers, a summary is presented of the type of inquiry we most often encounter.

Question No. 1—I've had a hand-fired coal furnace for a long time and have experimented with a large number of coals with all sorts of luck, both good and bad. What is the recommended method of hand firing a furnace?

Answer No. 1—The recommended method of firing coal is the "side-bank" method shown in Fig. 1. This is also referred to as the "alternate" method of firing. Briefly, it consists of firing the coal in such a manner that the glowing coal is never smothered with a fresh charge of coal. Just before firing, as shown in diagram 2, the glowing coals are piled over to one side or shoved to the rear of the firepot. The fresh charge is placed in the space made available, as shown in diagram 3. The gases given off by the fresh charge are ignited and burned, as shown in diagram 4.

Question No. 2—What is the purpose of this method of firing?

Answer No. 2—It has been found by common experience that this method of firing results in the following benefits:

a) It reduces smoke and soot

b) It reduces the waste heat passing up the chimney in the form of unburned gases

c) It reduces the possibilities of obtaining minor puffs or explosions

d) It reduces the soot accumulation on heating surfaces and in the smoke pipe

e) It provides a more responsive fire.

Question No. 3—Would you recommend it for soft coal?

Answer No. 3—We recommend it *particularly* for soft coal, since soft coal has more "bottled gas" stored in it than has hard coal. The engineer refers to this "bottled gas" as "volatile

matter." The amount of volatile matter in some soft coals may be as high as 40 per cent of the weight of the coal. This "bottled gas" is released from the coal as soon as it becomes heated, and unless immediately burned, it will pass up the chimney in the unburned form.

Question No. 4—That's very interesting. So when I burn coal, I may be actually burning gas. While we are on the subject now, tell me about the rest of the coal?

Answer No. 4—When you "cook" coal, and that is actually what you are doing when you burn coal, the "bottled gas" is released and so is the moisture in the coal. This moisture may consitute ordinarily from 2% to 10% of the total weight.

The remainder is carbon, which is the same stuff of which diamonds are made, and ash, which is simply the material which does not burn.

You can see, therefore, that when we "cook" coal we release the "bottled gas," we dry the fuel, we burn up the "rough diamonds," and finally obtain the dregs.

Side Bank Helps Anthracite or Coke

Question No. 5—Getting back to the side-bank method of firing, do you recommend it for anthracite?

Answer No. 5—We find it helpful in this case also, even though the amount of "bottled gas" is smaller and the amount of "rough diamonds" larger than with soft coal.

Question No. 6—What about coke?

Answer No. 6—Ordinary coke obtainable on the market has already had most of the "bottled gas" released from it. In other words, it is mostly "rough diamonds" or fixed carbon. Hence, the "side-bank" method is *not helpful,* and the homeowner might just as well cover his fuel bed with the fresh charge of coke.

Question No. 7—Speaking of coke, my short experience with coke wasn't very satisfactory. I couldn't seem to control it. What is the recommended procedure for coke firing?

Answer No. 7—The key to proper success in firing coke consists primarily in maintaining a *very thick fuel bed* to prevent the fuel bed from cooling off too much when the dampers are closed. A thick fuel bed is particularly necessary in mild weather when the heating demand is slight. Contrary to the usual home owner's belief *a thick fuel bed does not mean greater fuel consumption.*

In the case of strong drafts or for cases in which the fire responds too rapidly, it may be advisable to keep a fairly thick layer of ashes on the grate.

Question No. 8—What about this petroleum coke I hear about?

Answer No. 8—Petroleum coke is not always obtainable. It is composed of the residue from the petroleum cracking process and has extremely high heating value and practically no ash. It responds very rapidly to air supply and hence requires a layer of ash from four to eight inches on the grate in order to control it and in order to preserve the grate bars.

Tight Draft Door Essential

Question No. 9—You mentioned that a thick fuel bed for coke does not necessarily mean greater fuel consumption. Does that also apply to soft coal and anthracite?

Answer No. 9—It does, *provided* that the ash pit door and openings are tight enough to prevent the fire from "running away" and overheating the house. It is quite essential that ash pit doors close tightly.

You know that you cannot drive a car through

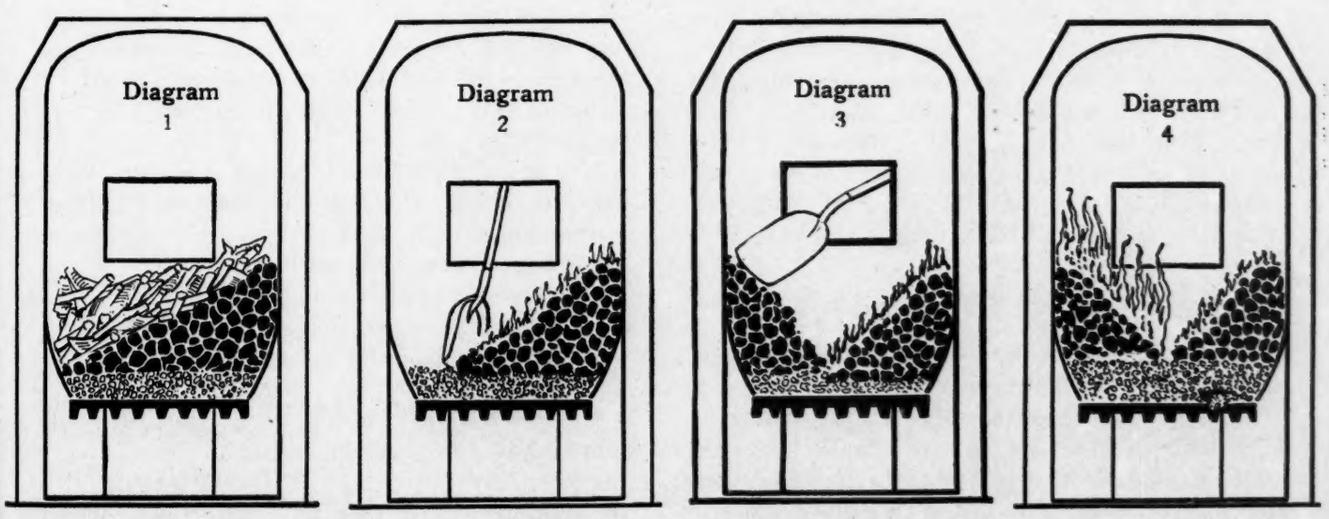
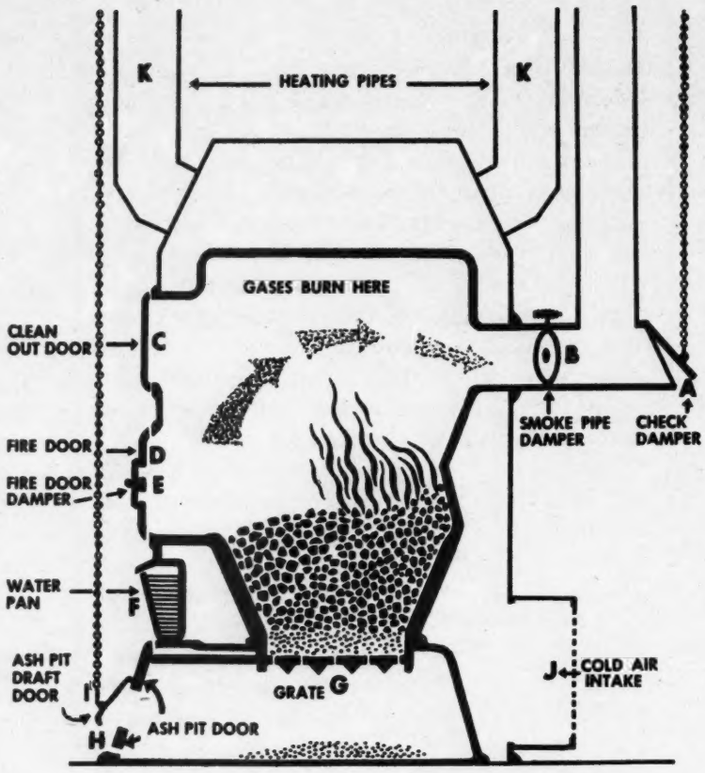


Fig. 1—Firing procedure by the "side bank" method starts the fire on a slope of green coal (diagram 1); when the fire burns briskly the fuel bed is shoved to one side (diagram 2); and a fresh charge of green coal (diagram 3) is placed in the space thus made; the result (diagram 4) is a smokeless, heat saving, clean and responsive fire.



Essential features of a "good" furnace—the important ash pit draft door, ash door, check draft, smoke pipe damper, firing door damper by which the fire is controlled.

heavy city traffic if the throttle is pulled out and if your only control is by means of the brake. Neither can you successfully operate a coal burning furnace if the ash pit door doesn't close tightly and sufficient air leaks by to give a fairly high rate of burning when you don't want it.

The control of the air entering below the grates corresponds to the throttle control on your car.

Question No. 10—What part of the furnace corresponds to the brake of the car?

Answer No. 10—Any opening above the fire. Your check damper, for example, tends to reduce the draft and hence the combustion rate.

Question No. 11—What about the cross damper?

Answer No. 11—I would compare the cross damper in the smokepipe to the hand brake on a car. Note that both the check damper and the cross damper tend to cut the amount of air pulled through the fuel bed. The less air you pull through the fuel bed the slower the fire burns.

Feed Door Air Supply

Question No. 12—Should the opening in the feed door be kept open or closed?

Answer No. 12—The more volatile matter or "bottled gas" you have in your coal, the more air you should supply *over the fire* through the opening in the feed door. For ordinary domestic heating practice we recommend that the overfire damper be left open at all times. If you are particularly fussy about firing, which I doubt, then I would advise you to close the opening about an hour after a fresh coal charge has been added.

Question No. 13—I fired a furnace at one time that overheated the house even though the ashpit damper was closed. It seemed that the fire kept blazing merrily along as long as the opening in the feed door was open. What would you recommend in a case like that?

Answer No. 13—There are some coals, particularly with high volatile matter, that will burn very readily even though the air is supplied over the fire. With coals of this nature it is most essential that the check draft in the smokepipe should function properly. You will probably find that the cross damper can be turned part way to such a point where there is still some draft over the fire, even with the check damper open.

What a Good Coal Plant Must Have

Question No. 14—I gather from our conversation that a good hand-fired furnace plant consists of:

a) a good chimney
b) a deep fuel bed
c) the alternate method of firing
d) a tightly closing ash pit door
e) some amount of air over the fire, and
f) an adequate check damper.

Answer No. 14—Right in all details. Your heating contractor can check your chimney to find out whether there is sufficient draft, he can file the rough spots in the ashpit door to be sure they close tightly, and he can clean your furnace to remove soot and fly ash.

Question No. 15—What sort of tools should I have to take care of my furnace?

Answer No. 15—Ordinarily the tools furnished consist of a poker, a scraper, and a coal shovel. However, if you can buy or make a metal hoe, you will find it a most convenient tool for moving the coal in the fuel bed. A metal plate about 4" x 6" attached at right angles to the end of a rod makes up the hoe.

If many clinkers are obtained, a clinker tong will also be helpful. Any tool which will aid the fireman in his work will tend to remove some of the drudgery connected with hand-firing.

Question No. 16—Speaking of aids to the homeowner, what do you recommend for ash removal? I don't like the dust and the sulfur odors obtained during ash removal.

Answer No. 16—The following procedure will prove helpful in removing ashes:

a) An ash pan that will comfortably slip through the ash pit door will collect most of the ashes that drop through the grates and will eliminate much shoveling.

b) A water spray or hose that can be used to wet down the ashes will help in keeping down the dust.

c) Remove the ashes from the ash pit before the grates are shaken. Then shake the grates until a few live coals drop through and allow the ashes to remain in the ashpit until the next ash removal. This will allow the ashes to cool off and will eliminate the release of sulfur dioxide in the basement.

d) When the grates are being shaken be sure the ash pit door is closed. Also stuff the opening around the shaker extension with a piece of waste. If some ash dust still comes out while the grates are being shaken, open up the firing door a few inches to draw in any dust that rises.

e) Keep the ashes in metal containers and not in wooden boxes or paper cartons.

This may sound like a complicated procedure. Actually this routine, once established, will take no more time than the usual haphazard dusty ordeal, and will be much less dirty.

"Cleaned" Coal Is Beneficial

Question No. 17—Is dustless coal worth the price?

Answer No. 17— We believe it is. Soft coal that has been oil treated will be much cleaner to handle than untreated soft coal.

Question No. 18—What do you gain by buying washed coal?

Answer No. 18—Coals from certain districts may contain much inert or dead matter. Many mines have installed expensive washing and sizing equipment in order to remove this dead matter, to remove the dusty fine particles, and to provide a uniformly sized fuel. Naturally, some coals that are quite free of dead matter to begin with, do not require this washing process.

Question No. 19—It is very convenient to be able to pick up large chunks of coal that will just go through the firing door. Do these lumps burn efficiently?

Answer No. 19—In general, block coal will not burn as efficiently as the smaller sized coal of nut or stove size.

Question No. 20—I used some Pocahontas coal that broke up into extremely small particles and was advised that wetting down the coal pile would keep down the dust. Would wetting the coal reduce the efficiency of firing to any extent?

Answer No. 20—Very little reduction in firing efficiency is obtained by *moderately* wetting the coal. It is true that the moisture that has to be evaporated requires heat, but on the other hand the wet coal tends to hold together the small coal particles and tends to reduce the amount of coal that falls through the grate without being burned.

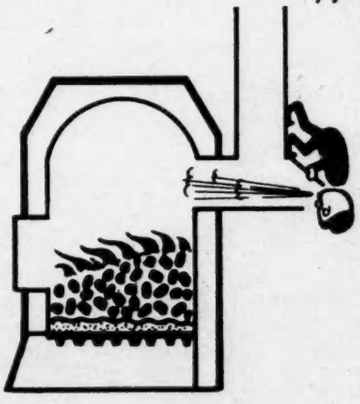
Question No. 21—What forms clinkers in the fuel bed?

Answer No. 21—Some coals have an ash that melts at lower temperatures than others. If the temperature in the fuel bed is high enough to melt and remelt the ash, the fluid ash will run down and solidify when it hits the cooler grate bars. This solidified form of ash is similar to the solidified lava that forms as a result of vol-

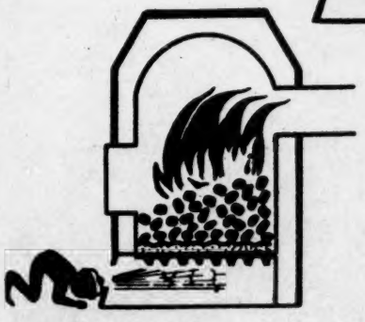
(*Continued on page* 108)

Right—The smoke pipe damper should be slightly open at all times. Do not meddle with this damper—set it for the chimney draft and leave it alone. This damper is a draft regulator—not a fire control.

Left—Over fire draft is necessary for burning high volatile coal. The slide may be full open when a fresh charge is placed, but should be closed somewhat after combustion gets underway.



Right—The more the check door is opened, the slower the fire will burn—the check should always be closed when the ash pit door damper is open. An open check means a "coasting" fire.



Left—The fuel burns briskly in proportion to the draft which comes up through the fuel bed. The ash pit draft door is the "accelerator" of your furnace. The door should be tight fitting.

Recommended Minimum Standards For Gas-Fired Winter Air Conditioning Systems and Low Temperature Warm Air Systems

Washington Gas Light Company
Washington, D. C.

[Part 4]

PARTITION WALL LOSSES
(B.t.u./sq.ft./hr./35° diff.)

Construction	Plain Wall	Finished One Side	Finished Both Sides	2" Mineral Wool or Equiv. One Side	4" Mineral Wool or Equiv. One Side Construction
Plaster-Base-Studs	...	21.5	12.0	4.0	3.5
½" Rigid Ins. Board-Studs	...	13.0	7.0	3.5	3.5
Sheathing-Studs	...	17.5	8.0	4.0	3.5
*4" Tile	15.5	14.5	14.0	3.5	3.5
*Sheathing Furring—4" Tile.	...	9.0	6.5	3.5	3.5

*Also for 4" cinder block in place of 4" tile.

ROOF LOSSES
(B.t.u./sq.ft./hr./70° diff.)

Ceiling Below Attic

	Plaster on Wood Lath	Plaster on ½" Insulating Board	Plaster on Foil-Coated Bldg. Board
No Insulation	23.0	16.5	17.0
½" Ins. Bd. on Roof Rafters—2 Air Spaces	14.0	11.0	11.5
1" Ins. Bd. on Roof Rafters	11.0	10.0	10.0
2" M. W. Over 2nd Floor Ceiling	8.5	8.0	...
4" M. W. Over 2nd Floor Ceiling	7.0	7.0	...
1 Foil Curtain in Rafters—2 Air Spaces	12.0	10.5	10.5
2 Foil Curtains in Rafters—3 air Spaces	10.0	9.5	9.5
Floored Attic (Unheated, Flooring Sealed)			
No Insulation	14.5	12.0	12.0
Attic Finished with Wood Lath and Plaster	10.5	10.0	10.0
Attic Finished with ½" Ins. Bd.	10.0	9.0	9.5
Attic Finished with 1" Ins. Bd.	9.0	8.5	9.0
2" M. W. Over 2nd Floor Ceiling	8.0	7.5	...
3⅝" to 4" M. W. Over 2nd Floor Ceiling	8.0	7.0	...
1 Foil Curtain in Rafters—2 Air Spaces	10.0	9.5	9.5
2 Foil Curtains in Rafters—3 Air Spaces	9.0	8.5	8.5

NOTE: "M. W." is an abbreviation of "mineral wool."
In the case of a ridge or hip roof the factors apply to the projected area of the roof surface except for heated attic. (See page 49)

GLASS LOSSES
(B.t.u./sq.ft./hr./70° diff.)

Single Glass	77
Double Glass	45
Glass Block	45
Skylights	90

FLOOR FACTORS
(B.t.u./sq.ft./hr.)

(Double Floor Construction)

A. Tight Space Under Floor

	Basement Under		No Basement Under	
	Overall	Rm. by Rm.	Overall	Rm. by Rm.
Open Joists:				
Ducts Above Uninsulated Floor	..	..	11	12
Bare Ducts Under Uninsulated Floor	12	6	12	10
Covered Ducts Under Uninsulated Floor	6	6	6	10
Insulated Floor—Ducts Above	6	6	7	6
Insulated Floor—Bare Ducts Below	9	6	13	6
Insulated Floor—Cov. Ducts Below	6	6	7	6
Closed Joists:				
Ducts Above Floor	6	6	7	6
Bare Ducts, Sheet Rock or Equivalent	8	6	15.5	6
Bare Ducts, 1" Sheathing or Equivalent	7	6	13	6
Bare Ducts, ½" Rigid Ins. or Equivalent	6	6	10.5	6
Covered Ducts	6	6	7	6

NOTE: In applying "House Heating Computation Procedure" table, (page 49) consider inclosed joists construction as insulated floor.

B. Floor Exposed

	Ducts Above Floor		Ducts Enclosed	
	Overall	Rm. by Rm.	Overall	Rm. by Rm.
Uninsulated Floor (Open Joists)	..	23.5	..	..
1" Rigid Ins. or Sub-Flooring (Open Joists)	..	15.5	..	..
Sheet Rock on Joists	..	17	28.5	11.5
1" Sheathing on Joists	..	15	24	8
Rigid Insulation on Joists	..	12.5	20	6
4" Mineral Wool or Equivalent	..	6	6	6

NOTE: If inclosed ducts are insulated, consider ducts to be above the floor.

C. Floor on Ground

	Overall	Rm. by Rm.
Any Construction	6	6

NOTE: Factor of 6 to be minimum value in any case.

DETERMINATION OF ATTIC HEAT LOSSES

1. Full value of loss always should be figured for floor area between knee or side walls and eaves.
2. If roof slope is not insulated and
   (a) Floor area between walls and eaves is not insulated:
   Figure knee or side wall at ½ wall loss.
   (b) Floor area between walls and eaves is insulated:
   Figure knee or side walls at full value of wall loss.
3. If roof slope is insulated from eaves to ceiling only:
   (a) Figure half value of wall loss (including slope insulation) for knee or side walls if rafter space at top of walls is sealed.
4. If entire roof slope is insulated:
   (a) Figure knee or side walls (including insulation) at full loss.
   (b) Use 10 as a minimum ceiling loss factor.
5. Dormers:
   (a) Figure end wall and ceiling area at full value of loss.
   (b) Figure side walls area to be the product of ceiling height x length of one wall at ceiling x 1.5 and apply regular wall factor.
6. In general, when selecting the proper heat loss factors to apply to the various surfaces, careful consideration should be given to the method of applying insulating material.

HOUSE HEATING COMPUTATION PROCEDURE

Percentage to be added to B.t.u. heat loss figure of heated space without basement and having ducts above ceiling or below floor or both:

	Apartment, Bungalow, Etc.	Two Story Building (One Furnace)
1. Ducts Above Ceiling		
Bare Ducts and Open Vents	20%	12%
Bare Ducts and Closed Vents	10	7
Covered Ducts and Open Vents	5	5
Covered Ducts and Closed Vents	..	..
2. Ducts Below Floor (No Basement):		
Uninsulated Floor, Bare Ducts, Open Vents	25%	15%
Uninsulated Floor, Covered Ducts, Open Vents	20	12
Uninsulated Floor, Bare Ducts, Closed Vents	15	9
Uninsulated Floor, Covered Ducts, Closed Vents	10	6
Insulated Floor, Bare Ducts, Open Vents	10	6
Insulated Floor, Covered Ducts, Open Vents	5	3
Insulated Floor, Bare Ducts, Closed Vents	5	3
Insulated Floor, Covered Ducts, Closed Vents	..	..

Note:—Consider inclosed poists as insulated floor.

INFILTRATION LOSS FACTORS

Infiltration Losses Per Cubic Foot

(B.t.u./cu.ft./hr./70° diff.)

	Wood Sash			
	Unweatherstripped		Weatherstripped	
House	Single Sash	Double Sash	Single Sash	Double Sash
Row	1.2	.7	.75	.5
Semi-detached	1.4	.7	.90	.5
Detached	1.5	.7	1.00	.5

Metal Sash

	Single Sash	Double Sash
A. Houses of less than 15,000 cubic feet content		
Row	.75	.5
Semi-detached	.90	.5
Detached	1.00	.5
B. Houses of 15,000 cubic feet or more content		
Row	1.1	.6
Semi-detached	1.3	.6
Detached	1.4	.6
C. Commercial and Industrial buildings		
Row	1.5	.7
Semi-detached	1.7	.7
Detached	1.8	.7

This Part 4 concludes our publication of the Washington Standards. The tables in this issue and the tables published in the November issue are for use in selecting design factors suggested in Parts 1 and 2 which appeared in the September and October issues.

A Simplified Data Sheet

which saves hours in dampering, eliminates sources of trouble from uneven heat distribution, and is filled in from charts.

By Robert L. Marks
Topeka, Kansas

HERE is a Data Sheet which does not require a college or even a high school education to use. While it may require a little more time, a little more application to figure the job, it will save hours in adjusting dampers, and dollars in revamping trouble jobs. It requires the use of three charts and two tables, all simple, and requires a minimum of time to use.

Chart No. 1 is the friction chart by Mr. G. A. Voorhees. Chart 1 gives the size pipe for any given quantity of air at any set velocity and the resistance in inches of water, but for pipes of 100-foot lengths only.

Chart No. 2 is by Mr. R. H. Schultz and corrects the sizes of pipes found in Chart No. 1 for 100 feet to the size for the equivalent length of the run.

Chart No. 3 by Mr. J. Donald Kroeker, finds the temperature drop in the ducts. Table No. 1, by Mr. A. Wagstaff, shows the correct duct size con-

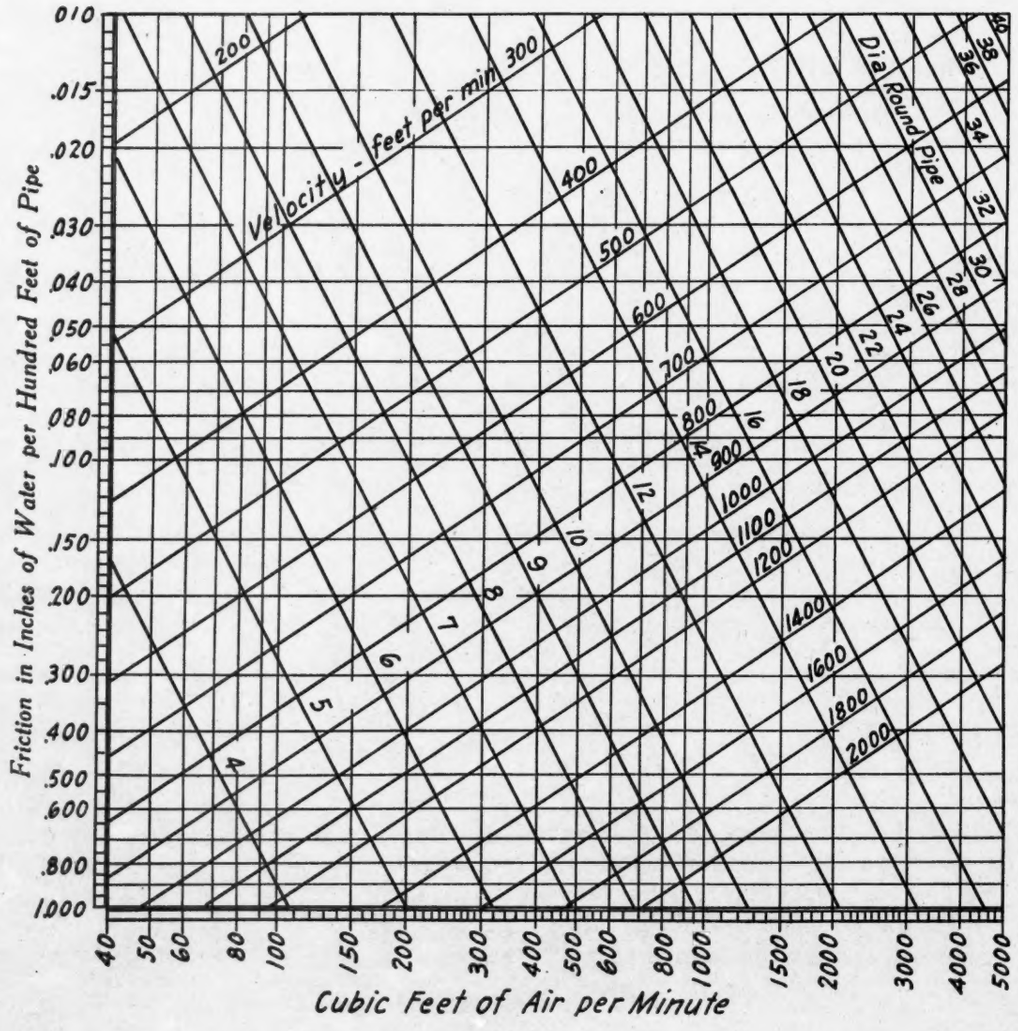


Chart 1

This Friction Chart was especially prepared for the range of small pipe sizes and low velocities used in residential heating. Prepared several years ago, some changes have been suggested, but the chart is perfectly satisfactory as it is shown.

On Facing Page—

Right, top—The Temperature Drop Chart is for bare tin or galvanized ducts. If insulation is used multiply the factor of cfm times FPM by the square of 1.3 and divide by the square of the emissivity coefficient which applies.

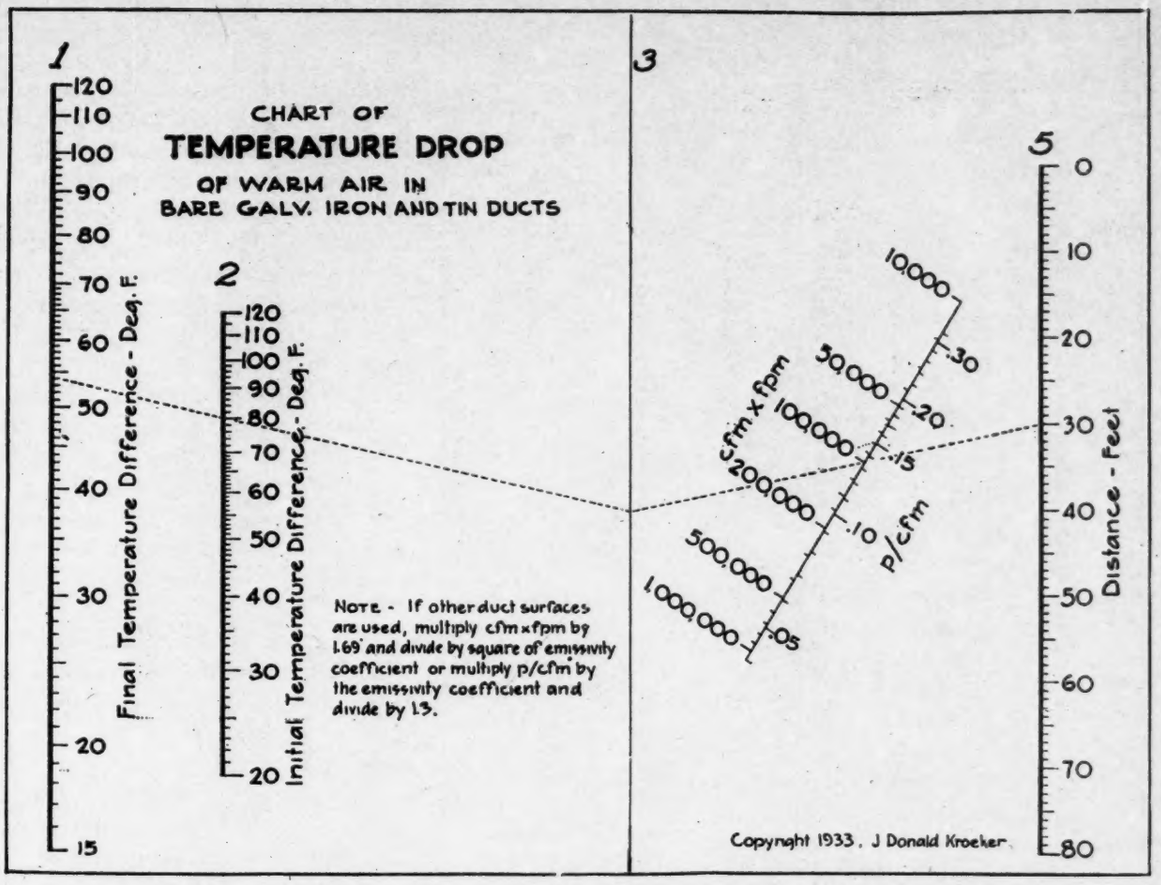


Chart 3

verted from round pipe as found.

Table No. 1 appeared in the AMERICAN ARTISAN, September, 1937; Chart No. 1 has appeared in the ARTISAN several times; Chart No. 2, ARTISAN, September, 1938; Chart No. 3, ARTISAN, November, 1934. The articles accompanying the charts give full detail and direction. Chart No. 2, as published, goes to no larger than a 12-inch pipe; I have extended this to as large as a 25-inch pipe on the chart I use.

These charts as published are necessarily small; they can be enlarged at very little expense.

In the accompanying example we are estimating velocity at 600 F.P.M., bonnet temperature, at 160 deg., basement temperature, 60 deg., a duct system 8-inch deep, plain galvanized iron, 26 Ga.

Table I

EQUIVALENT ROUND AND RECTANGULAR DUCTS FOR EQUAL FRI

Size of Rect. Duct	2½	3	3½	4	4½	5	6	7	8	9	10
	DIAMETER AND AREA OF EQUIVALENT										
8	4.7 17.3	5.2 21.2	5.7 25.5	6.1 29.2	6.5 33.2	6.9 37.4	7.6 45.4	8.2 52.8	8.8 60.8	... ...	... ...
8½	4.9 18.9	5.4 22.9	5.9 27.3	6.3 31.2	6.7 35.3	7.1 39.6	7.8 47.8	8.5 56.7	9.1 65.0	9.6 72.4	... ...
9	5.0 19.6	5.5 23.8	6.0 28.3	6.5 33.2	6.9 37.4	7.3 41.9	8.0 50.3	8.7 59.4	9.3 67.9	9.9 77.0	... ...
9½	5.1 20.4	5.7 25.5	6.2 30.2	6.6 34.2	7.1 39.6	7.5 44.2	8.2 52.8	8.9 62.2	9.6 72.4	10.2 81.7	10.7 89.9
10	5.2 21.2	5.8 26.4	6.3 31.2	6.8 36.3	7.2 40.7	7.7 46.6	8.4 55.4	9.2 66.5	9.8 75.4	10.4 84.9	11.0 95.0
10½	5.4 22.9	5.9 27.3	6.5 33.2	7.0 38.5	7.4 43.0	7.8 47.8	8.6 58.1	9.4 69.4	10.0 78.5	10.7 89.9	11.3 100.3
11	5.5 23.8	6.0 28.3	6.6 34.2	7.1 39.6	7.6 45.4	8.0 50.3	8.8 60.8	9.6 72.4	10.2 81.7	10.9 93.3	11.5 103.9
11½	5.6 24.6	6.2 30.2	6.7 35.3	7.2 40.7	7.7 46.6	8.2 52.8	9.0 63.6	9.8 75.4	10.5 86.6	11.2 98.5	11.8 109.4
12	5.7 25.5	6.3 31.2	6.9 37.4	7.4 43.0	7.9 49.0	8.3 54.1	9.2 66.5	10.0 78.5	10.7 89.9	11.4 102.1	12.0 113.1
12½	5.8 26.4	6.4 32.2	7.0 38.5	7.5 44.2	* 8.0 50.3	8.5 56.7	9.4 69.4	10.2 81.7	10.9 93.3	11.6 105.7	12.2 116.9
13	5.9 27.3	6.5 33.2	7.1 39.6	7.7 46.6	8.2 52.8	8.7 59.4	9.6 72.4	10.4 84.9	11.1 96.8	11.8 109.4	12.5 122.7
13½	6.0 28.3	6.6 34.2	7.3 41.9	7.8 47.8	8.3 54.1	8.8 60.8	9.7 73.9	10.6 88.2	11.3 100.3	12.1 115.0	12.7 126.7
14	6.1 29.2	6.7 35.3	7.4 43.0	7.9 49.0	8.5 56.7	8.9 62.2	9.9 77.0	10.8 91.6	11.5 103.9	12.3 118.8	12.9 130.7
14½	6.2 30.2	6.8 36.3	7.5 44.2	8.1 51.5	8.6 58.1	9.1 65.0	10.1 80.1	11.0 95.0	11.7 107.5	12.5 122.7	13.2 136.8
15	6.3 31.2	6.9 37.4	7.6 45.4	8.2 52.8	8.7 59.4	9.2 66.5	10.2 81.7	11.1 96.8	11.9 111.2	12.7 126.7	13.4 141.0

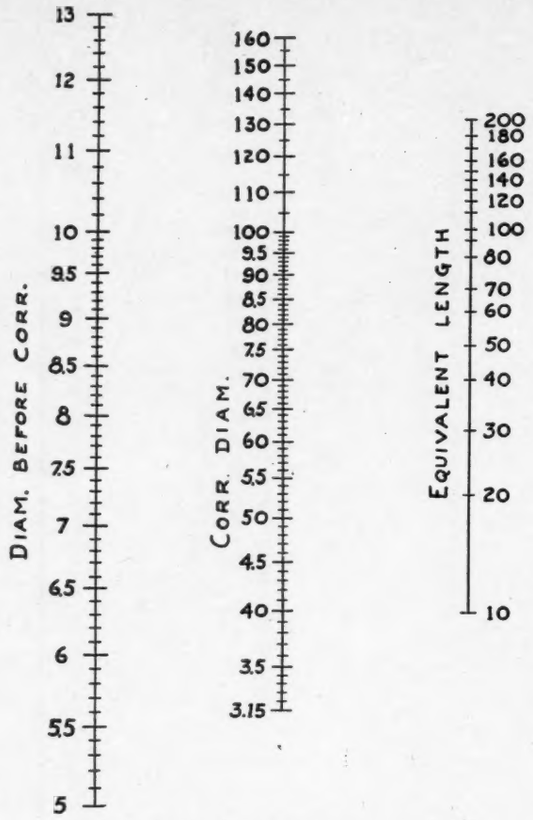

DIAM. BEFORE CORR.
CORR. DIAM.
EQUIVALENT LENGTH
THE ABOVE CHART IS FOR CORRECTING RD. PIPE DIAMS. SO THAT, REGARDLESS OF RESISTANCE, THEY WILL HANDLE REQUIRED C.F.M. AT DESIGN STATC PRESSURE
– R.H. SCHULTZ

Chart 2

The procedure is as follows: First make a skeleton plan as per Fig. 1. Then fill in the data sheets as follows:

Column 1—Stations. Follow the flow of air from the furnace, the main trunk lines are lettered, the outlets into the rooms numbered, the first change takes place at *A*, follow over to *B*, then to *2*, then *3*, back to from *A* to *C* and so on, listing the stations in rotation on the sheet.

Column 2—B.T.U. loss.

Column 3—Actual length of run in feet.

Column 4—Equivalent feet, found as per explanation. This is the resistance against the blower; is the distance to the most extreme point. Find the distance to the numbered stations first, and the equivalent length at lettered stations will be the extreme distance that there is resistance against the blower.

Column 5—Assumed station temperature. We assume that the temperature drop will be 1 deg. per running foot. The temperature drop will differ as to the temperature difference between air in duct and basement temperature; material from which the duct is constructed; velocity and quantity of air. Chart No. 3 will correct this.

Column 6—C.F.M. This is the C.F.M. that would be required if our temperature drop was correct. Again we find the C.F.M. for the numbered stations first as the sum of these will be the total required, and we list the amount for each station in its proper place. The total (in this case 822) is listed at *A*; we then list at other lettered stations the amount each will carry.

Column 7—The round pipe as found by Chart No. 1. We also find here our S.P. The chart shows that 822 C.F.M. at 600 F.P.M. will require a 15.8-inch pipe and the resistance will be .045 inches of water. We size the rest of the pipes from this chart, using .045 resistance.

Column 8—Using Chart No. 2 we find the proper size pipe for the equivalent length, in relation to that found for 100 feet on Chart No. 1.

Column 9—Convert pipe size into duct size, using Table No. 1.

Right here we have what could be called a conclusion, and a system installed and sized as found in column 9, will prove efficient, and the adjusting of dampers much less complicated than in the usual installation.

Columns 10, 11, 12, 13, and 14, are listed so that Chart No. 3 can be more rapidly, and readily read. The captions explains their use.

Column 15—Lists the resulting temperature in each room and shows a differential of 6. This is

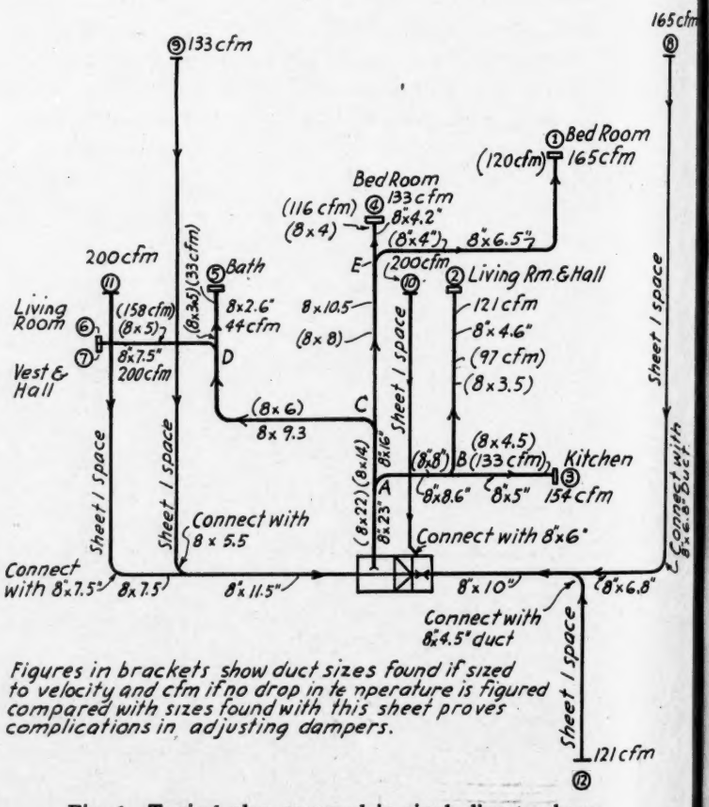


Fig. 1—Typical plan prepared in single line to show location of registers, furnace and pipes. Then, as the Data Sheet is filled in, the calculations may be transferred to the plan so that a plan with full data may be filed or used for erection.

The Data Sheet

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Stations { Bonnett Temp.—160° Basement Temp.—60°	B.T.U. loss	Actual length of run—ft.	Equivalent length = Act. + 10 ft. for 90° El. Act. + 5 ft. for 45° El.	Assumed Sta. Temp. 1° loss for each Act. Foot	C.F.M. = B.T.U. loss / 14.4×D×TD D = Weight of air TD = Temp. Dif. entering air and desired room Temp.	Pipe size for 100 Ft. of resistance Chart No. 1*	Pipe size corrected to equivalent length, Chart No. 2	Rectangular size equalized to same resistance as round size—Table No. 1	Velocity = F.P.M. = C.F.M. / Area (Sq. Ft.) F.P.M.	C.F.M. × F.P.M. (Line 2 on Chart No. 3	Distance air travels between stations (Line one on Chart No. 3)	Temp. Difference between Basement air and air in ducts (Line 4 Chart No. 3)	Temp. at Stations, (Line 5 on Chart No. 3) + Basement air	Room Temp. = Req. Temp. − B.T.U. loss / 14.4 × D × C.F.M.
A	.....	4	66	156	822	15.8	14.5	8x23	640	525,000	4	100	158	.....
B	.....	8	48	152	265	10.3	8.9	8x8.2	585	155,000	4	98	154	.....
2	7850	18	48	142	115	7.6	6.6	8x4.6	450	51,500	10	94	138	66.5
3	10750	14	34	146	150	8.5	6.8	8x4.9	550	82,500	6	94	144	68.5
C	.....	7	66	153	557	13.6	12.5	8x16.2	605	346,000	3	98	156	.....
D	.....	20	66	140	249	10.3	9.5	8x9.3	475	120,000	13	96	142	.....
6-7	12750	26	66	134	206	9.5	8.7	8x7.8	475	98,000	6	82	136	71.5
5	2670	23	53	137	43	5.3	4.7	8x2.5	310	13,600	3	82	134	69.5
E	.....	16	61	144	308	11	10	8x10.5	540	165,000	9	96	148	.....
1	9720	31	61	129	170	8.8	8	8x6.8	450	77,000	15	88	131	71
4	9475	18	28	142	138	8.1	6.2	8x4.2	590	81,500	2	88	145	72.5
Total	53215													

STEP No. 2

A	.....	4	66	158	817	15.8	14.5	8x23	640	525,000	4	100	158	.....
B	.....	8	48	154	275	10.6	9.2	8x8.6	580	160,000	4	98	154	.....
2	7850	18	48	138	121	7.7	6.6	8x4.6	470	57,000	10	94	138	70
3	10750	14	34	144	154	8.6	6.9	8x5	550	85,000	6	94	144	70
C	.....	7	66	156	542	13.4	12.3	8x16	610	330,000	3	98	156	.....
D	.....	20	66	142	244	10.1	9.4	8x9.3	465	116,000	13	96	142	.....
6-7	12750	26	66	136	200	9.4	8.6	8x7.5	480	96,000	6	82	135	69
5	2670	23	53	134	44	5.4	4.8	8x2.6	310	13,600	3	82	135	71
E	.....	16	61	148	298	10.9	10	8x10.5	510	152,000	9	96	146	.....
1	9720	31	61	131	165	8.6	7.9	8x6.5	460	84,000	15	86	130	69
4	9475	18	28	145	133	8.1	6.2	8x4.2	550	73,000	2	86	143	68

*Estimated velocity = 600 F.P.M. Estimated static Pressure = (Step No. 1 = .045) (Step No. 2 = .045).

too much for a real good job. It does not mean that these rooms will heat to this temperature under any or all conditions, but does mean that they will heat to this differential.

Step No. 2—We make an exact copy of columns 1, 2, 3, and 4 and in column 5 in Step No. 2 we copy the correct station temperature as found in column 14 of Step No. 1, and proceed from there exactly as we did in Step No. 1. The results show a job with only a 3 differential.

The returns are figured the same, except no attention need be paid to temperature drop. It is desirable on this job to use the joist space for returns. This can be properly done. While the friction is much greater with constructions such as are used in joists, yet the excessive area in this case is so much greater, we know we can sheet the joist with safety.

Bear in mind that the blower will return air from the line of least resistance, the same as it delivers, the proportions will be related to the resistance. In this case, unless the proper resistance is built up at other stations, it is doubtful that stations 8 and 9 will work at all.

We want to return 165 C.F.M. from station 8 (figured at .045 S.P.). At our equivalent distance will require a duct 8x7. Station 12 figured at the same S.P. and its equivalent distance this requires an 8x4.5 duct. At other stations shown on Figure No. 1 where the ducts connect from the joist space, the length of the duct should be no less than three times its equivalent diameter.

Except of course within certain bounds, the blower may deliver 900 C.F.M. or 1200 C.F.M., but *if the branches are properly taken off*, the house will heat to the same differential, as the proportions are all relative.

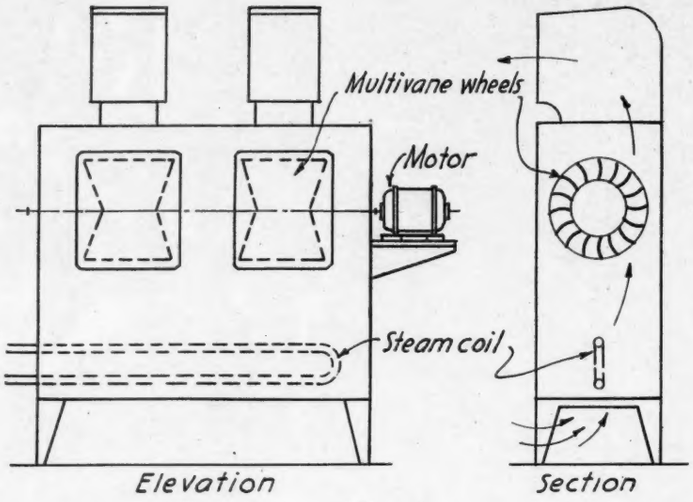


Fig. 1

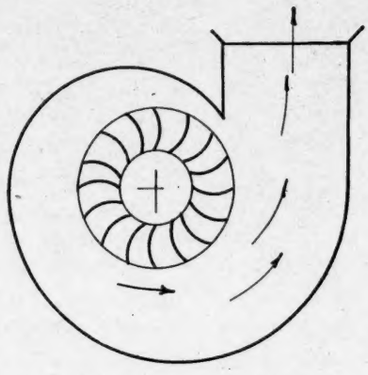


Fig. 2

Some Common Causes of Fan Failure

By J. W. Baybutt

ONE of the most common centrifugal fan troubles is that where the wheel is running backwards. Strange as it may seem, this trouble still occurs, even though electricians have been advised repeatedly. An experience about 10 or 12 years ago, illustrates the situation.

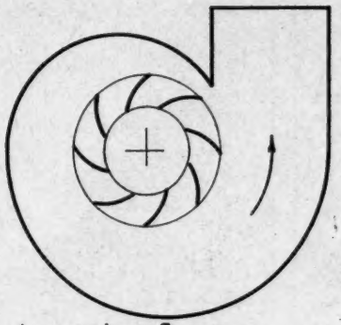
At that time high velocity, unit heaters were in their infancy. We had built a new maintenance shop and for heat had recommended steam fed, unit heaters as shown in Fig. 1 in place of the then prevalent wall radiation. On viewing the pygmy heater (as compared to cast iron wall radiation) the mechanics laughed at such a design to heat such a large shop. It certainly couldn't work and on the day when the steam and electric connections were made it happened to be near zero. The heating system did not properly heat the building. Of course the electrical foreman called up the engineer and said: "I told you so." There was something wrong and it happened to be the fan running backwards, the irony being that the complainer had made the mistake for he didn't pay any attention to the direction arrow. Yes, the fan did deliver air running backwards (as most all centrifugal fans will) but not nearly as much air delivery as when running the right way. The unit heater is still working OK.

In some cases the wheels can be placed backwards on the shaft which will offer serious difficulties to efficient operation. Figs. 2, 3 and 4 show some fundamental types of fan blades and their general direction of rotation.

Set screws fastening the wheel to the shaft have sometimes loosened allowing the shaft to rotate and the wheel to follow suit if it desires which it does not when the load begins to increase. Keys have sheared or been left out with the same results. Even the pulley can loosen on the shaft or the belt may be slipping or broken, not to mention the fact that the motor may not be running even though the switch is in. Single phasing sometimes occurs on A. C. motors, which condition changes the speed and resultant capacity of the fan. D. C. motor speeds can vary tremendously so don't believe the name plate. On direct drive units, couplings have been known to fail. Put an rpm counter on the fan shaft after making sure the wheel will follow the shaft.

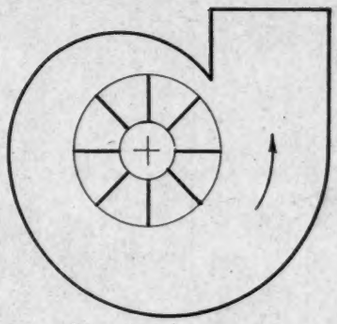
There are many other troubles in fan construction and method of installation that need to be checked if the volume of air handled is not up to standard. Fig. 5 shows two possibilities particularly with the larger size fans which have been dismantled and reassembled by mechanics not too familiar with fan construction. Broken or absent blades usually make themselves known by noise or vibration.

In the layout give the fan a break and feed the air evenly to the inlet and not as in Fig. 6. Ells or dampers near the inlet and in some cases near the outlet do not help the fan to do a good job. Watch the materials used in the fan construction. Corrosion from moisture or certain fumes play havoc with fan blades. Remember there is a fan to fit the job so don't fit the job to the fan.



Large size, few vanes, backward curved.

Fig. 3



Straight vanes, few in number, steel plate.

Fig. 4

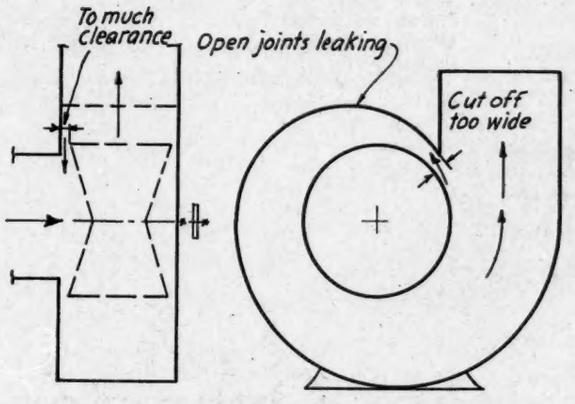


Fig. 5

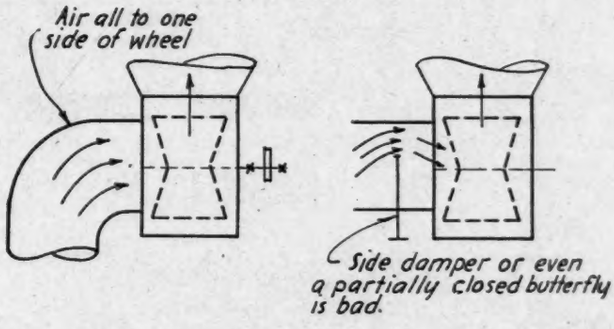


Fig. 6

Floor-Slab C. A. Plenum Plus Attic Supply Reduces Piping

(*Continued from page* 41)

velocity but distribution through diffusion.

The L. C. Smith Company is building an excellent house including attic floor insulation and insulating board sheathing—all of which reduces heat loss. For example, the heat loss of the house photographed with a gravity furnace has only 50,000 B.t.u. loss.

Because the attic will be cold, Mr. Tharp is fully insulating all warm air pipes and the warm air plenum.

Some interesting reactions have been obtained from purchasers of these houses. Fuel costs have been really moderate. The owner of the gravity furnace heated house, as an example, reports the highest monthly gas bill for last winter $13.00. This includes gas for heating, cooking, domestic water, and a gas operated refrigerator.

One of the housewives has found that she can be perfectly comfortable in the coldest weather without shoes or stockings on either carpeted rooms or on the kitchen linoleum. She thinks this is such an unusual comfort condition that she believes in telling about it to everyone interested.

In the opinion of Mr. Tharp and builder Smith, these heating systems have these advantages—floors are warm without basements; cold air piping is eliminated without sacrificing results; warm air distribution is by the cheapest duct work; stacks, or partition piping is eliminated; space is conserved to a maximum degree; the houses have been uniformly comfortable in all kinds of weather.

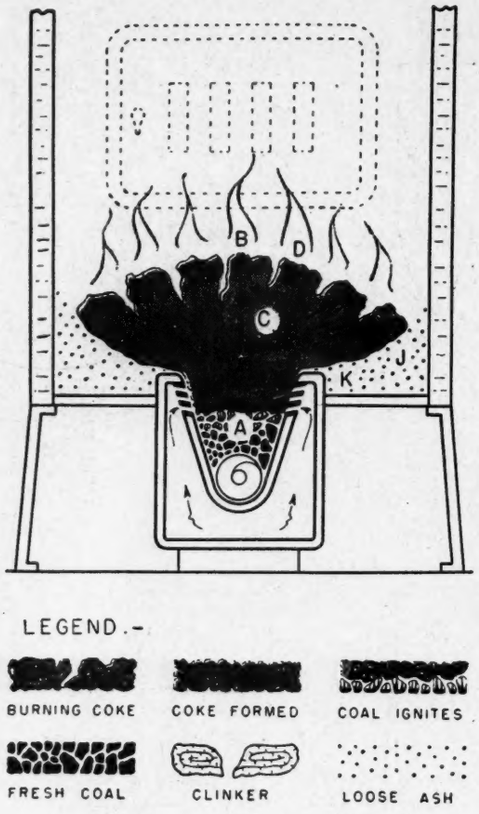


Fig. 6—Typical deep fuel bed shortly after removal of clinker showing how ash formed at top "B" moves back into fire "C" and back to top "D" and eventually out to "J". With moderate accumulation of refuse, the deep bed keeps clinker out of the retort.

Rudiments of Small Stoker Operation

By S. H. Viall

Chief Combustion Engineer
Chicago, Wilmington & Franklin Coal Company

This article, second in a series of copyrighted articles published, appeared in The Rescreener, house organ of the Chicago Wilmington & Franklin Coal Company, under the title—"Along the Firing Line." The articles are, we think, about the simplest, easy-to-understand discussions of small stoker operating problems in the long list of published material on stoker firing. They should tell readers what to do to insure customer satisfaction.

A deep fuel bed in the small underfeed stoker can deliver ash refuse farther from the retort than a thin fire, which is quite desirable from the standpoint of successful operation. Fig. 6 illustrates a deep fire shortly after removal of the clinker. Fig. 7 shows similar conditions with a thin fire.

A piece of coal represented at A, Fig. 6, moves upward to the top of the fire as at B. There it burns and is reduced to a few particles of fine ash dust. If the temperature is high enough the ash dust will become sticky. With a still higher temperature the dust will be converted to a liquid. The higher the temperature the thinner the liquid will be. The ash, in the condition of dust or liquid, will drop downward as to C. The dust, or liquid cooled and solidified to a clinker particle (possibly smaller than rice), will be pushed back toward the top of the fire, as at D. Through repeated up and down movements the ash material is finally delivered toward the outer edge of fire as at J.

With a domestic stoker proportioned similar to the illustration, it is possible that the temperature near the edge of the firebox as at J may not be high enough during times of light or modest load to consolidate the ash dust or small clinker particles into a clinker large and firm enough for easy removal with clinker tongs. But, it is probable that firm, easily handled clinkers will form closer to the retort, where the temperature is higher, as at K.

Hot, Thin Fire Needs Frequent Attention

In a similar way a piece of coal A′ of Fig. 7 is moved to the top of a thin fire and the ash material is finally delivered toward the outer edge of the fire as at K′. Observe that K′ is not as far from the retort as is J of the thick fire in Fig. 6. With a thin fire, the refuse, as it is released from the burning fuel, will tend to concentrate in a small area close to the retort. Much of the loose ash shown at the sides of the firebox in Fig. 7 is "fly ash," blown there by air blast that was too strong for the depth of the fuel bed. With the same stoker and firebox and the same amount of coal used per hour, the thin fire requires more frequent attention for cleaning.

Figs. 8 and 9 illustrate the condition of the same fires as shown in Figs. 6 and 7, after considerably more coal has been used. The top of the fires in Figs. 8 and 9 are a few inches higher than in Figs. 6 and 7. But, there is no increase in the amount of usable fuel in the fireboxes. It is possible that there may be less. The apparent increase in volume of the fires results from the increase in loose ash and clinker.

Form Clinker Around, Not In, Retort

Fig. 8 shows that because the refuse was delivered further away from the retort, by the wider spread of the thicker fire, the clinker K formed where it should be, in the space provided for refuse. There were two factors that caused the clinker K′ of the thin fire in Fig. 9 to extend into the retort and partially close off the air inlet openings:

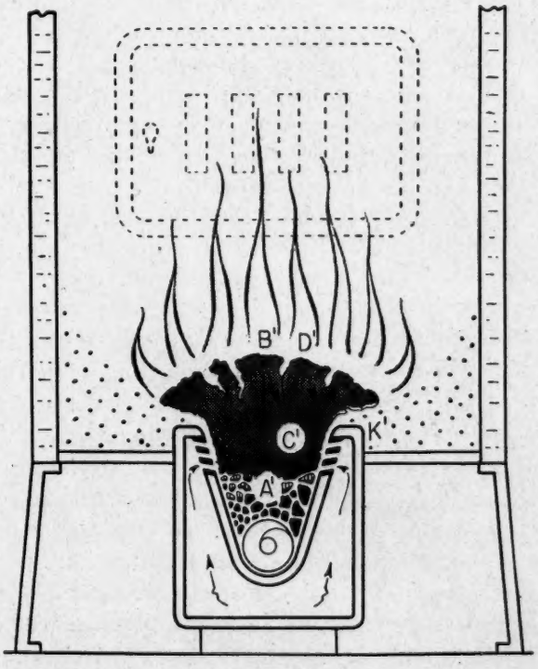


Fig. 7—In a thin fire, ash formed at "B" can only move to "K" which is just above retort so clinker can form on retort and even run into retort air slots if clinker is not removed at frequent intervals.

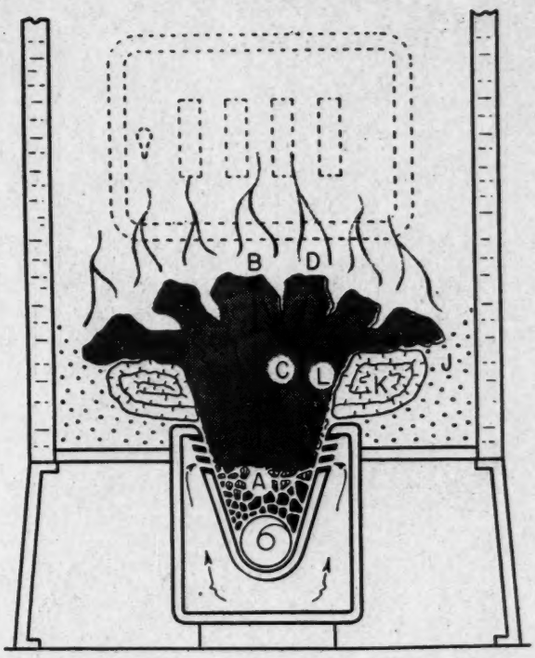


Fig. 8—Another deep and wide fuel bed with refuse and ash "J" and clinker "K" away from retort. This fire should be cleaned as "K" and "J" offer no additional heat and space is needed for ash from coal yet to be burned.

First—There was not enough movement of the fuel sideways to carry the ash material far enough from the retort.

Second—In order to develop the same amount of heat as the thick fire the thin fire was required to liberate more heat per square inch of fire area. This resulted in higher temperatures in the fire.

The higher temperature of the fast burning, thin fire converted some of the ash material into liquid. Refuse accumulated and filled the space close to the retort. After the space at K′ was filled the only place molten ash could drain was down the face of the clinker into the retort as at L′. Incoming air cooled and solidified the molten ash. As the process continued, the clinker grew and extended down into the retort until it blocked off some of the tuyere openings. If the cleaning of such a fire is neglected or delayed too long it is possible for the clinker to shut off many of the tuyere openings. There have been cases where molten ash has flowed into tuyeres where it solidified. In removing such a clinker from the retort the pieces of it extending into the tuyere openings may be broken off and left there as "plugs." It is usually possible to remove such "plugs" with a hooked rod, although sometimes chipping and chiseling may be required to get the tuyeres open again.

Clinkers May Cause Firebox to Fill with Coal

Oxygen is absolutely essential to all combustion. When a clinker seriously reduces the air supply and the stoker continues to feed coal, it

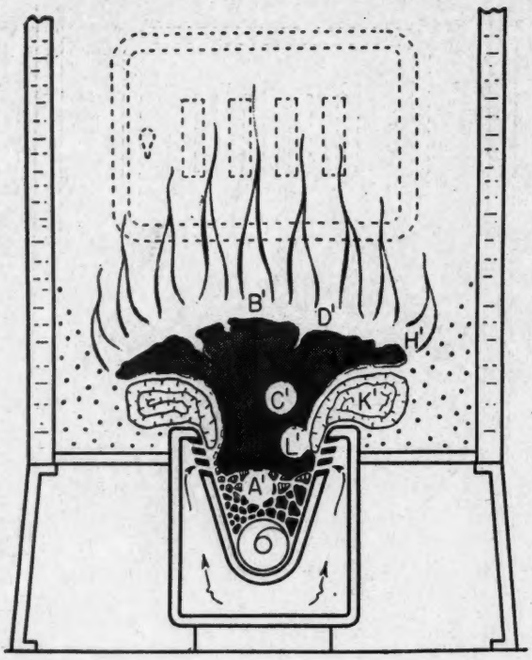


Fig. 9—The clinker "K" is in the retort because there was not enough fuel movement sideways to carry ash away and because the thin fire burns coal rapidly.

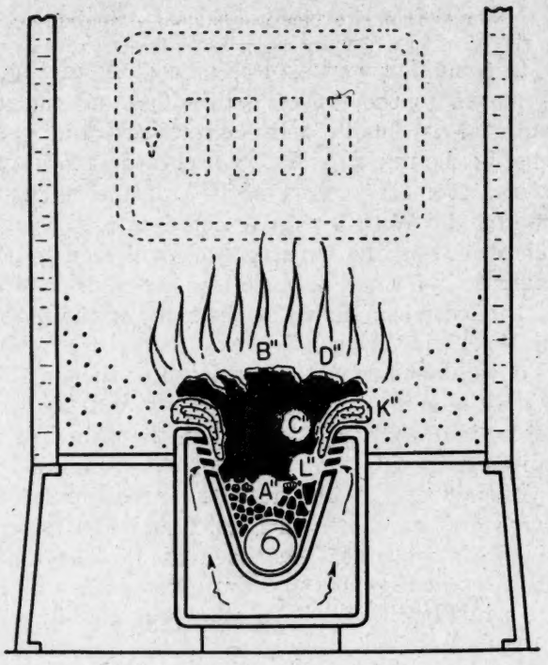


Fig. 10—A o-small" fire forms clinker in the retort but, more serious, forms one clinker after another in the retort so that the retort is never free of clinker. The remedy is a thicker, wider fuel bed.

is possible that the firebox may become filled with fresh or half burned coal. If this should happen, a practical procedure would be to remove a sufficient amount of the unburned fuel so that the clinker can be taken out. Before starting up again make sure there are no "plugs" in the tuyere openings. It is possible that during this work refuse becomes mixed with the coal and coke in the firebox. At intervals, as frequent as an hour or so, it is advisable to determine whether new clinkers are forming. If they are forming, remove them. This close attention should be continued until it is certain that the surplus ash mixed with the fuel has been removed and that there is ample space around the retort for the refuse that will accumulate before the next cleaning.

Three Helpful Hints

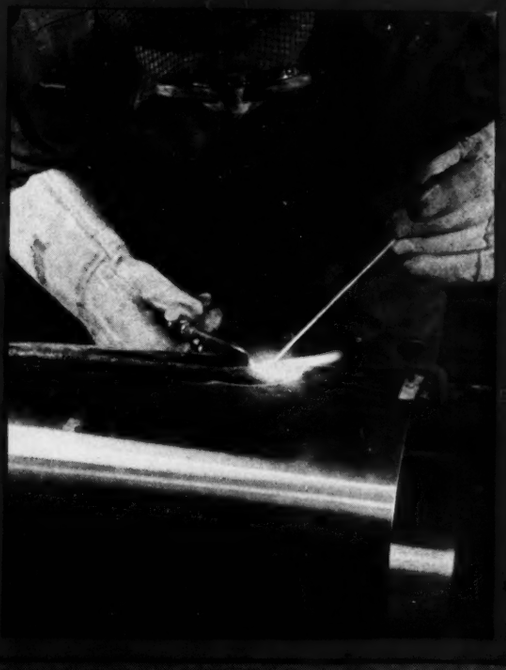
Unpleasant experiences of this kind can be avoided by (1) maintaining a deep and wide fire that can deliver the refuse well beyond the edges of the retort, (2) cleaning the fire often enough to provide space for the accumulation of refuse, (3) using minimum air pressure practical for the rate of burning needed to do the required heating. Avoid excessive air blast and the sharp, fast burning fires that require more frequent and more skilled attention.

Sometimes small stokers are improperly operated with fires so small that the ash refuse cannot be delivered outside the retort. Fig. 10 illustrates a fire thinner than the one shown in Fig. 9. Service men sometimes find cases that are worse than that shown in Fig. 10. When the fire is hot enough clinkers will form on the edge of the retort as at K". After a small amount of coal is burned, following clinker removal, a new clinker will build up at K" and there will then be no opportunity for refuse to get outside the retort area. It will accumulate in the retort as at L". After removing the clinker from within the retort, there may still be considerable ash material mixed with the fuel in the retort.

As soon as the fire gets reasonably hot another clinker is formed that may seriously interfere with the proper supply of air. This can occur within a few minutes after removing the first clinker. A small fire containing a quantity of ash may become so hot that the ash, as at C", is converted into a thin liquid which may not be cooled to a solid until it has drained down onto the incoming coal. In this way it is possible to form a clinker covering the full area inside the retort. Observe that the fast burning of a thin fire is an important factor contributing to the formation and location of undesirable clinkers.

For most satisfactory service it is advisable to provide ample space outside the retort for refuse accumulation. It is essential that refuse be removed often enough to avoid accumulation in the retort. Under ordinary loads a deep and wide fuel bed is very helpful in keeping refuse out of the retort, and reduces the frequency of cleaning. In a later article there will be an explanation of how good results can be obtained with low load and small fires during mild weather.

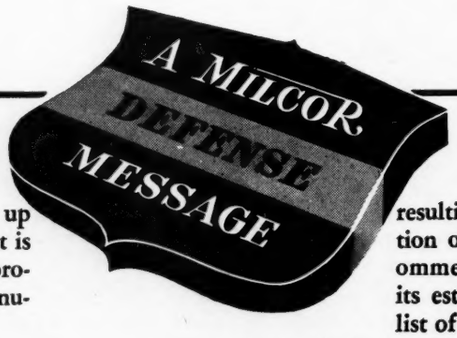
SHEET METAL SECTION



DEVOTED TO SHEET METAL CONTRACTING AND FABRICATING

Simplification

AN EMERGENCY MEASURE THAT PROMISES LONG-RUN BENEFITS TO THE BUILDING INDUSTRY



IN ORDER TO HELP speed up national defense, the government is formulating an industry-wide program to simplify the lines of manufacturers' products.

Appreciating the importance of saving critical materials and releasing machine power and man power, Milcor Steel Company has already simplified its various lines.

For instance, there have been five or more gauges of Stove Pipe — when one or two would have satisfied almost every consumer requirement. Metal Lath has been manufactured in a great many weights of materials . . . Furnace Pipe and Fittings in many gauges . . . Eaves Trough, Conductor Pipe, and Accessories in more sizes and gauges than were necessary.

The purpose of simplification is to weed out those particular sizes, weights and styles of products whose existence never was justified by any substantial consumer demand—and thus to reduce waste. Many lines of products "just grew". Many a manufacturer added a new size or gauge just to have something different from his competitor's.

A short time ago the Bureau of Standards made up a list of benefits resulting from the practical operation of 181 simplified-practice recommendations worked out under its established procedure . . . The list of *advantages to the distributor* (both wholesale and retail) is the largest. Briefly, these advantages are:

1. Greater turnover of items in stock.
2. Elimination of slow-moving products.
3. Concentration on standard lines — those which are easiest to sell.
4. Sales efforts confined to fewer products.
5. Smaller capital investment in both new stock and repair parts.
6. Decreased overhead and handling charges.
7. Less storage space required.

Actually, sales work should be considerably easier as a result of the simplification movement. The consumer gains definite advantages which can be emphasized by the dealer in making sales — *better values* and *better service* in delivery and repairs.

In the hardware and building industries, simplification will be a relief all down the line from manufacturer to distributor, dealer, consumer and owner. We view it as more than a temporary emergency measure. We believe it is a desirable permanent feature of our industrial economy in both war and peace.

MILCOR STEEL COMPANY • MILWAUKEE, WISCONSIN

CANTON, OHIO • CHICAGO, ILLINOIS • KANSAS CITY, MISSOURI

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SALES OFFICES IN PRINCIPAL CITIES

Soldering, Brazing, Welding in

"Streamlined" Sheet Metal Training

By Ernest E. Zideck

Instructor, Technical School, Jackson, Michigan

SOLDERING, as a means of joining metal, is an art in itself. And although with the introduction of the radio into almost every home everybody started doing "soldering," the fact remains that there are very few real solderers available. By doing soldering we do not mean for an amateur to be able to do a fairly good job at joining wires or soldering up a hole in a dishpan. By "soldering" we mean professional soldering such, for instance, as a tin roofer would do in soldering upwards of thirty squares of the roof in a single day; or, in torch soldering, as a man would do in soldering up the hundred and some tube ends protruding through the headsheets of a radiator getting paid 12 cents per radiator and earning between eight and nine dollars a day doing it.

What we mean by professional soldering, whether by coppers or torch, is the exact knowledge of the various fluxes to use on different metals and the ability of doing soldering of a lap joint of a tin tube or such a joint in a zinc pipe or galvanized or copper or brass utensil to the riveted joint and the "sweating-in" kind of soldering called for in seams and heavy gauge constructions.

Soldering Must Be Learned by Practice

A man is a professional in soldering whose hands are attuned to the movement of the copper or the manipulation of the torch flame in doing soldering. An accurate knowledge of the flux to use in soldering tin, copper, brass; or zinc and galvanized; or the other metals; may be learned and memorized by an intelligent student listening to the instructor or reading a book on the subject. But the "handling" of the soldering iron or the torch can not be so learned. This art may be acquired by practice, but it can not be imparted.

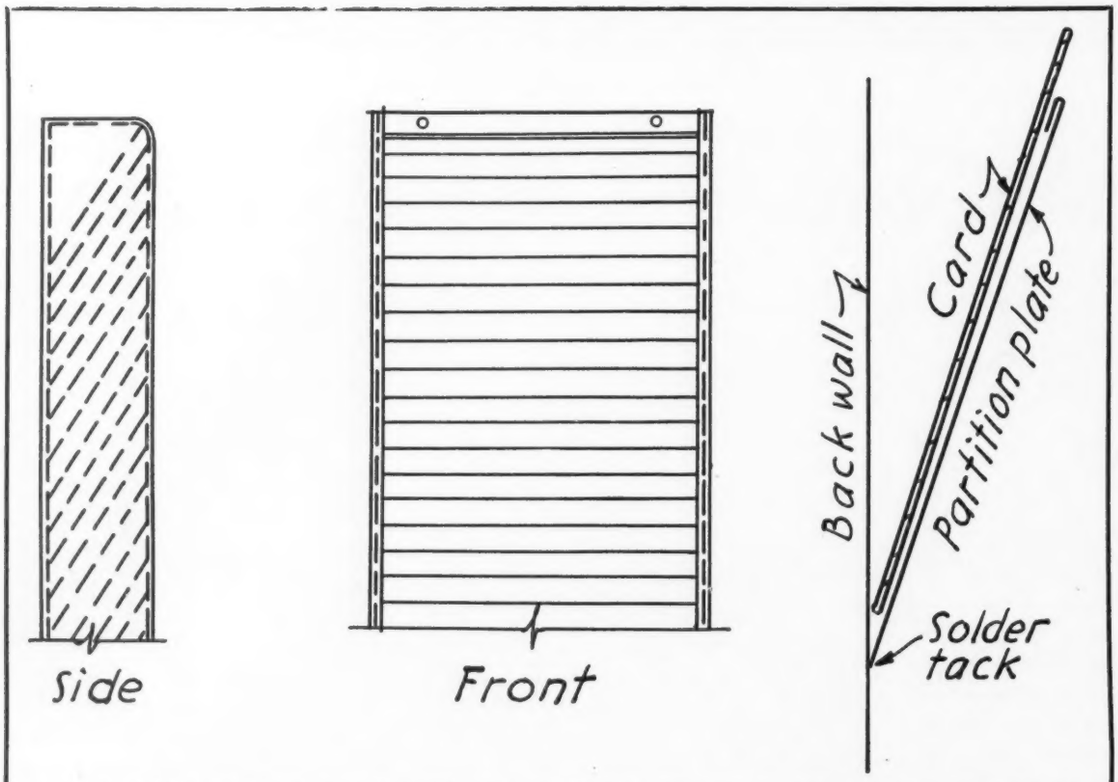
The student must be instructed of how to use the iron, how to "tin" its tip, how to heat it for certain kind of soldering, how to apply the tip to the metal soldered and other pertinent points; but the real action of moving the copper to make the solder flow in-between the lapped metal as the copper swiftly passes over the joint, without the solder remaining heaped up on top of the lap or forming unsightly crusts on either side of the joint; the joint being watertight with practically no solder seen on the surface of the joined metal —this kind of soldering must be learned by almost identical experience as is that of a piano pupil learning to handle the piano keys. This also applies to the handling of the torch flame. In the hands of an expert the flame will make the solder flow in any direction; or it will not flow, just pile up around a pipe joint, for instance, forming a smooth "crown" around the pipe, making the soldered joint that much more secure.

Teach Soldering by Demonstrating

Soldering by coppers still is predominant in architectural sheet metal work; galvanized and copper sheets replacing the older tin or lead coated sheets. A new field for such soldering has been created in the making of restaurant and bar and ice cream parlor utensils. And although little soldering is being done in the warm air heating field, in a sheet metal shop there crop up numerous jobs which must be soldered. Torch soldering has a more limited field. But a man who has acquired an expertness in the handling of the soldering torch may easily switch over and do brazing. Or, with a more exacting practice, he may become an acetylene welder.

In a class room in which soldering is being taught, the instructor is called upon to do much demonstrating. He will have his troubles in trying to "unlearn" the young men who, almost without exception, have done "soldering" before. It is more difficult to induce a man to abandon a bad habit or practice, than it is to teach a newling. In soldering especially, the wrong ways in which the men will persist, will tax the instructor's patience.

In such instruction it is imperative that real



A Card Holder, for hanging on the wall, or by making slopes more vertical, standing on the desk. Each card protrudes from the holder just enough to show the Name or the Number, as the case may be, and the teacher or the office girl has no difficulty finding the particular card quickly, extracting it from the holder and replacing it. The frame is made of heavier gauge metal, but the partitions may be the lightest, with the top edge trebled for rigidity and smoothness, the partitions needing but solder-tacking to hold. There being a large number of the partitions in the frame, the item presents an opportunity to the students in a sheet metal class to practice quantity shearing, folding, braking, fitting and soldering.

soldering work be done by the teacher, impressing the student who watches the process with the difference in making the solder flow or melt with the copper tip not tinned properly, or the copper not hot enough, or too hot, or muriatic acid used on tin or copper or one of the "fluxes" containing rosin applied to galvanized or zinc. The student will marvel at the ease with which the instructor will make the solder follow the soldering tool, be it copper or torch.

A demonstration of the properly heated iron doing the work smoothly and swiftly may best be given in using a heavier gauge copper sheet or utensil to experiment on. Invariably the "green" solderer will pile solder on the metal without being able to melt it. And here is the opportunity for the instructor to demonstrate effectively how soldering must be done on different metals and different thicknesses. The sufficiently hot 2-pound soldering iron, its tip tinned bright, needs only to be held on the metal until the metal absorbs the heat to melt the solder fed to it, with the movement of the soldering tool causing the solder to follow the tool. The lapped joint in a 16 oz. copper pipe, for instance, practically "sucks" in the solder—no solder shows, only the solder's thin coloring remaining on the lap's surface.

To demonstrate the importance of sufficient heat in the soldering iron for doing soldering on a heavier gauge object, the instructor may proceed by discarding the two-pound iron and trying to do the soldering with a light-weight iron. He may let the student see that the light-weight iron, heated as much as practical without burning up the tin on the tip, will scarcely melt a bit of solder in contact with the metal. The iron will cool off as quickly as brought to contact with the object. Re-heating the soldering iron and trying again will not produce better results.

Here the instructor can do effective teaching, explaining why the light-weight soldering tool will not do the work the heavy-weight iron did. He then may demonstrate on other metals, showing that the light-weight iron will do good soldering on a very small tin cup or funnel, but not so on a tin washboiler, although the metals are the same in all respects, one as thick as the other. Or, he may show that the light-weight iron will solder the edge of a lapped galvanized pipe but

it will not melt the solder enough to do a good soldering job on that same pipe being seamed, or "sweat-in" the solder if the pipe is riveted.

In teaching torch-soldering the instructor will succeed best if he demonstrates the importance of "heat" as he did in soldering by irons. Again he may use a heavier gauge copper pipe or similar object in contrast with light gauge copper or brass sheet. The student will profit from seeing the torch flame melting the solder on the light sheet practically before the flame touches the metal; and watching the flame in its intensity directed to one particular spot of the heavier metal for twenty or more seconds before the solder fed to the joint will commence flowing.

Brazing Is Torch Soldering

The torch-soldering experience will greatly facilitate the student's learning to do "brazing." Brazing resembles in all particulars soldering. Just as soldering will not hold without the metal being lapped, so brazing will not hold if there is no "lap." Flux is used in soldering and flux is used in brazing, although the fluxes differ and their application varies. And just as the piling up of solder on the joint is not soldering, so the piling of the bronze in brazing is not brazing.

In both arts the metal to be joined must be pre-heated to melt the joining medium. In soldering it is not the iron or the flame that melts (or should melt) the solder. It is the pre-heated metal that must receive the solder and, melting it, suck it into the lap, seam or riveted joint. This applies to brazing. The flame of the torch must not be directed at the brazing rod itself. The rod is held above the flame, slightly in contact with it to keep it at near the melting point, but the heat from the torch is directed to the metal to be brazed, causing the metal to change color to a trace of cherry red (in steel), before the bronze rod is contacted with it.

The rod will melt and flow and spread out just as far as the metal has been pre-heated to the right degree. It will stop flowing at the fringe of the pre-heated spot. To make it flow farther the flame must be moved along, heating the fringe and beyond, the molten bronze following in the path of the flame, spreading out as the flame is spread, in all respects behaving as solder does in torch soldering. The rod is dipped in the borax from time to time, the borax ready above the brazed spot to be applied to the metal when the bronze refuses to follow the flame.

Soldering-brazing instruction may become very interesting to the students as they watch the instructor applying heat to the joint of a suspended metal object, the wire-solder or the bronze rod held in readiness below the flame, the preheated metal sucking in the solder or the bronze, causing it to flow upwards.

As in any other subject of instruction under the present program, the trainees are expected to acquire skill in doing the work fairly swiftly, so in soldering-brazing instruction stress must be laid on quick results. We would not have use in the shop for a wizard who could demonstrate to us the flowing of solder or bronze upwards; but any shop could use to advantage a man who can do good soldering or brazing in record time. Therefore in the present course of training the instructor must concentrate on teaching that imparts to the student the knowledge of "how to do the work"; and then let him try and try practicing the work, until he learns rapidity of movement along with the secrets of the art and becomes able of doing the work by standards prevalent in the trade.

Acetylene Welding

Acetylene welding is only a step further in the manipulation of the torch in doing soldering and brazing, with the difference that welding requires *no lap,* and the metal is joined together by its edges or, butts. This kind of welding is comparatively easy after the student has learned to heat up the metal to a trace of cherry red in brazing, without burning the metal. In acetylene welding the flame is regulated to a short, thin, white point. The metal under the flame assumes the color of yellow instead of red before the welding rod will fuse with it. As in soldering and brazing, so in welding the piling up of the medium on the joint is not wanted. The piling up of the rod on the metal is not welding. It does not hold. Rather, the student should be shown how the metal under the flame, having been heated to yellow, will eagerly receive the drops from the rod held in contact with the whitish point of the flame, the drops *flowing* as soon as they touch the preheated metal, fusing with it, filling in the gap between the two metal edges and solidly connecting them. True, the danger of burning holes in the metal is greater in welding, because yellow is only a step removed from white, and white is the melting point of the metal.

The majority of training schools provide equipment for both iron and torch soldering and brazing-welding by acetylene flame. Not so for spot-welding and arc welding. These two processes, in absence of equipment on which to demonstrate and practice, may be taught by illustration and explanations of the equipment and comparisons with acetylene welding. Spotwelding may be taught by showing the lapped joint destined for riveting and explaining how, by bringing the lapped metal in between the two electrically laden points, the spark penetrates through the two metals, melting the one into the other (in spots), so that the spots will hold as rivets do.

Arc welding will be more difficult of teaching

(*Continued on page* 106)

Uses and Limitations of Radiant Heat For Baking Organic Finishes*[Part 2]

By G. Klinkenstein
Vice-President and General Manager
Maas & Waldstein Company

The Advantages of Radiant Heat Baking

FROM the standpoint of production—When radiant heat baking is carried on under proper conditions, it possesses the following physical and economic advantages, as compared with convection-oven baking:

1. Since the surface to be baked heats up to baking temperature almost immediately under the impact of the radiant-heat rays, and high energy-densities can be employed, if desired, there is no long preliminary heating up period. In consequence, baking operations that require an hour in a convection oven are commonly accomplished in less than 10 minutes by the radiant-heat process. Lacquers can be dried dust-free in 10 minutes.

2. The radiant-heat process is admirably adapted for baking work handled by conveyors so that it is especially suited for high-speed mass production.

3. Radiant-heat baking equipment is simple, light in weight, and highly flexible. It can be installed at almost any point on the conveyor line where there is sufficient length of travel and can be removed and replaced elsewhere at will. The lamp racks can be mounted on the floor, suspended from the ceiling, or attached to walls.

4. The space required by a given radiant heat installation averages about one-third, and maybe as little as one-tenth, of that required by a corresponding convection oven.

5. The cost of installation is low. No insulating walls, doors, or automatic temperature controls are required.

6. Maintenance costs are low. Lamps are the only parts that need regular renewal, and these last from 5,000 to 10,000 hours or more. The installation needs no special care beyond cleaning lamps and reflectors about once a month, if open reflectors are used, or merely cleaning the lenses if sealed reflectors are used.

7. If the equipment is properly installed and maintained, there is little danger of fire or explosion.

8. Working conditions are comfortable because a radiant heat oven does not raise the temperature of the surrounding air to high temperatures. On standing directly behind the lamps, one has little sensation of heat.

From the standpoint of finishing.—The industrial finisher favors radiant heat baking, where it is applicable, for the following reasons:

1. Since the whole operation is visible, every step in the baking process can be carefully controlled.

2. By arranging the lamps so that they illuminate the work evenly, without shadows or over-illuminated spots, uniform baking is assured.

3. Conversely, the heat can be directed and confined to any desired zone or arranged in any desired pattern, thus permitting special baking effects and utilizing the radiated energy with high efficiency.

4. If the finish is being improperly baked at any point, the trouble can be immediately detected and corrected, thus reducing spoilage.

5. Baking conditions, when once set, will be rigidly maintained, if voltage, speed of travel of the products, and air conditions are kept constant and the equipment is properly maintained at all times.

6. Large surfaces, which must be baked vertically, are best baked in radiant-heat ovens, because the entire surface can be heated uniformly, whereas in convection ovens, it may be difficult to secure uniform heating due to the presence of heat zones.

7. Coatings on massive products, if properly selected, can be baked quickly in radiant-heat ovens, since it is not necessary to bring the entire product up to baking temperatures.

8. "Case hardening" does not occur; that is, no surface film, which interferes with the escape of the solvent, forms on the coating.

9. There is less danger of "chilling," which may cause wrinkling, crystallization, or loss of gloss.

10. Under proper supervision, changes of finishing schedules are easily made.

*Address at Annual Convention, American Electroplaters' Society, June 11, 1941, and published in Metal Finishing, Organic Finishing Section.

Finishes for Use with Radiant Heat Baking

In any organic finishing operation it is important to select the finish to suit the product, the finishing process, and the service to which the product is to be subjected, but when radiant-heat baking is employed, the finish must be selected with special care. The longer the time required to bake a finish by the radiant heat process, the greater will be both the amount of heating equipment required and the cost of the current consumed. Hence, for the sake of both speed and economy, the finish selected should always be one that will produce the desired results with shortest baking period.

Several unusual problems are encountered in formulating finishes for radiant heat baking. For example, blacks heat up rapidly under radiant heat rays because they absorb the radiation almost completely; whites, however, heat up more slowly because they reflect a large part of the rays; and other colors occupy intermediate positions between these two extremes.

Theoretically, it is possible to compensate for these differences by varying the setting of the lamps or increasing or decreasing the wattage, but in practice, it is much more satisfactory to change the finish so that similar products can be baked in the same oven regardless of their color.

Again, solid products, especially those in the form of rods or spheres, heat up much more slowly than sheet metal products under radiant heat because the heat applied to the surface is conducted away by the mass of metal in the interior. If the same finish is used on both kinds of products, it will be necessary to reduce the speed with which the solid products travel through the oven or to increase the length of the oven, but by using different types of finishes, both kinds of products can be baked with equal speed.

Wrinkle enamels offer a special problem. Enamels of this type, as formulated for convection-oven baking, tend to flatten out under radiant-heat rays. Hence, wrinkle enamels for radiant heat baking should be specially formulated.

In general, close cooperation between the user of the finish and the finish manufacturer is essential if the best results are to be secured with radiant-heat baking.

When a radiant-heat baking installation is first set up, it can be assumed that it will operate efficiently with the finish to be baked by it. But unless this finish was expertly selected in the first place, a more efficient one might be substituted for it, so that it is always wise to check this point.

When the work for which the oven was designed is completed and changes are to be made in either the product or the finish, the finish manufacturer should always be consulted, since he can supply the type of finish best suited to the particular conditions under which the oven is going to operate.

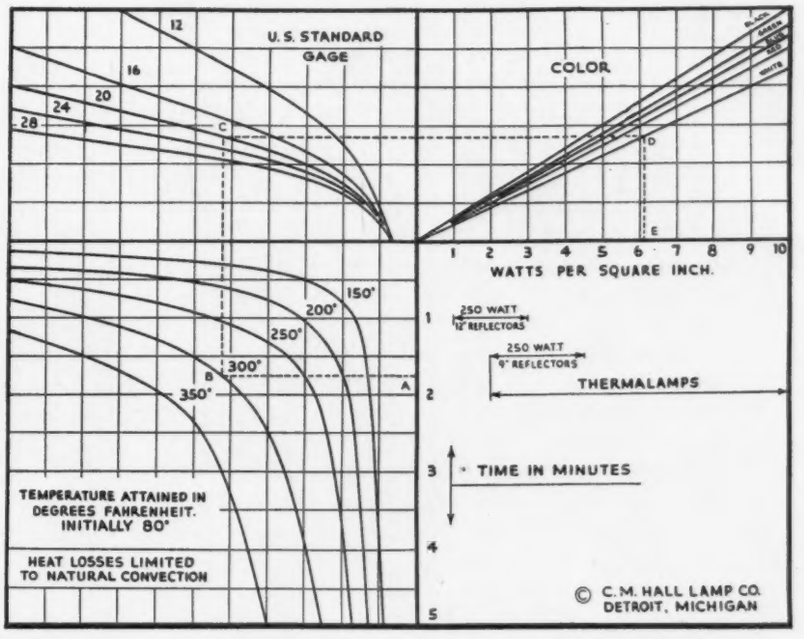


Fig. 4. Performance chart for radiant heating. This chart is workable both ways (A) At a given time in minutes and knowing the degree of temperature to be used and the gauge of metal being baked, and the color of synthetic enamel being baked, the watts per square inch input necessary are disclosed. (B) On the other hand, if the watts per square inch input from radiant heat equipment are known, then by tracing an imaginary line up to the color of synthetic enamel, over to the gauge of metal, down to the temperature necessary, the line can be extended over to the minutes required to bake the paint. (Courtesy C. M. Hall Lamp Co., Detroit, Mich.)

Installation and Operation

Without attempting to cover the engineering features of a radiant-heat baking installation with any degree of completeness, the following details are mentioned because they are of special interest to the user of the equipment.

Special radiant-heat baking lamps, which emit more than 90% of their energy input in the form of radiant-heat rays, are supplied in 250, 500, 1000 watt sizes. All sizes are supplied with sep-

arate reflectors, and the 250-watt size is also supplied with self-contained reflectors.

Gold-plated reflectors, though not especially efficient as reflectors of visible light rays, reflect 98 per cent of the radiant heat. Oxidized aluminum reflectors, which reflect from 75 to 91 per cent of the radiant heat, are also used. Silver, when bright, is a highly efficient reflector, but it is impractical because it tarnishes easily.

A new coating for reflectors that is coming into use is vaporized aluminum. It is said to have a high degree of permanence, ability to withstand oven temperatures, and a reflectivity that is estimated to be 20% higher than gold over mean life conditions.

Open reflectors are round or hexagonal (interlocking), and can usually be adjusted so that the rays emitted by the lamps will be convergent, divergent, or parallel, as required.

Lenses are now being used to give better heat distribution and avoid hot spots, and reflectors of special designs are also employed for the same purpose. These new types of sealed lenses and reflectors with 1000-watt lamps have increased the usefulness and scope of radiant-heat baking.

They are supplied mounted individually, or in multiple reflector strips, flexible tunnels, and flat banks. As the separate sealed lamps thus mounted have a considerable range of adjustment, ovens of almost any description can be built up of these units. They can be designed to combine radiant heating with convection heating by suitable enclosures.

When 250-watt lamps are used, they must be placed within 8 to 14 inches of the surfaces to be baked. Best results are generally secured when the distance from lamps to work is between 10 and 12 inches. Using 1000-watt lamps, enclosed by special new reflectors and lenses, it has been possible to increase the distance from the lamps to the work up to 18 inches. The work must be fully and evenly illuminated, with no part to be baked in a shadow. The basic problem with radiant-heat baking is, in fact, to place the lamp correctly.

With the lamps properly placed, the energy requirements of the process are from 2 to 10 watts per square inch, or from about 300 to 1500 watts per square foot.

Twenty-gauge sheet steel, painted black, is heated in 5 minutes to 280° F. by 2 watts per square inch, and to 500° F. by 6 watts per square inch. When heavier gauge steel or lighter colors are used, the temperatures are somewhat less for the given time and wattages.

The greater the wattage per square inch, the quicker the desired temperature is attained and the greater the efficiency of the process. For this reason, it is frequent practice to expose the work to an excessive wattage at the entrance to the oven, so as to raise it quickly to baking temperature; this temperature is then maintained in the body of the oven with a lower wattage.

Radiant heaters are also sometimes placed in front of convection ovens, so as to raise the temperature of the work quickly without danger of damaging the finish through pimpling, cratering or wrinkling, which might occur under like conditions in a convection oven.

Cylindrical or elliptical ovens, with open-reflector lamps, are used for baking products that are finished over-all and are not too irregular in shape. These ovens are efficient because they minimize shadows, cold spots, and upward drafts. Two parallel flat banks of lamps are used for baking sheets and other flat objects. Special arrangements often have to be made to bake products of irregular shape or larger dimensions. Sheet metal coated on one side is best baked by heating the unfinished side.

When lamps with closed reflectors are used, the oven should be enclosed in a sheet-iron casing, and, for general purposes, its cross-section should be a rectangle with rounded corners.

Drafts retard baking and decrease the efficiency of the process, but some ventilation through the oven is required to remove the solvent vapors. The natural ventilation caused by air currents heated by the hot work is usually sufficient for vapor disposal and does not seriously interfere with the operation of the oven. In special cases, draft shields and exhaust hoods may be needed to remove excessive amounts of solvents.

When products pass through an oven at intervals, current can be saved by the use of automatic switches which turn on the lamps in front of each piece as it travels through the oven and turn off the lamps after it passes.

When using open reflectors, the reflectors and lamps in the lower portions of the oven tend to become covered with a film of finishing materials, which decreases their reflectivity. All types of reflectors can be cleaned by wiping them off with cotton bat dipped in the proper type of thinner to dissolve the film of finish. Gold-plated reflectors can be cleaned more thoroughly by dipping them into a solution of caustic soda, or into a solution of 2 oz. trisodium phosphate to a gallon of water followed by a dip in 4% hydrochloric acid. After using either of these methods, rinse and polish lightly.

Fire Safety Precautions for Radiant Heat Ovens

All electrical equipment must be installed in accordance with the National Electric Code. For greatest safety, lamps should be enclosed.

Oven should be cut off by approved means from

(*Continued on page* 110)

Simple Jig For Sheet Metal Welding*

A COMPANY manufacturing heating and air-conditioning equipment has increased the speed with which radiator grille frames are made from sheet metal, by bronze-welding them in a specially designed, clamping jig. Bronze-welding is particularly well suited to this type of production work because the quickly made bronze weld gives a strong joint, minimizes the possibility of distortion because of its low-temperature heating effect, and requires no finishing other than simple cleaning. The jig itself should prove useful for many similar welding operations since it can be adapted to a wide range of metal thicknesses and to varying angles at which the parts are to be joined.

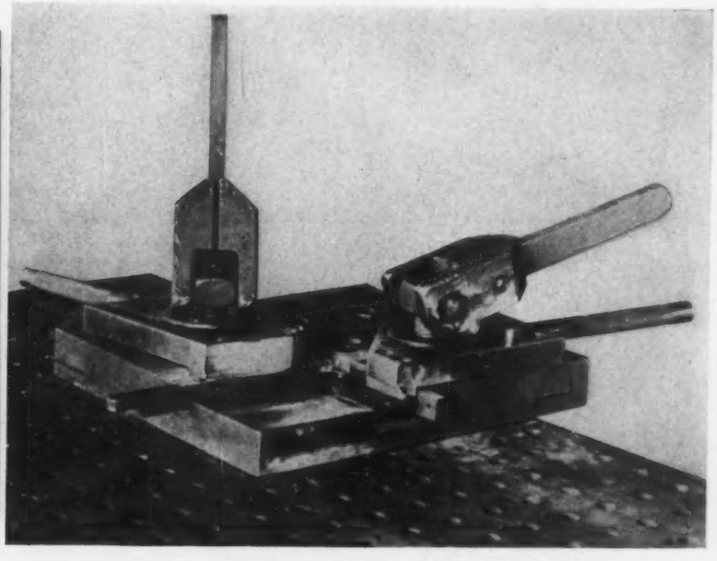
T-sections of preformed sheet metal are held securely in the jig during bronze welding of their mitered joints. This simple jig speeds setting-up time and reduces distortion to a minimum.

To make the radiator grille frames, narrow lengths of 16-gauge steel are just formed into inverted T-sections with one side of the base wider than the other and with the top leg flanged at the top. Four of these lengths, with mitered ends, are then bronze-welded into a rectangular frame.

Special Clamping Device

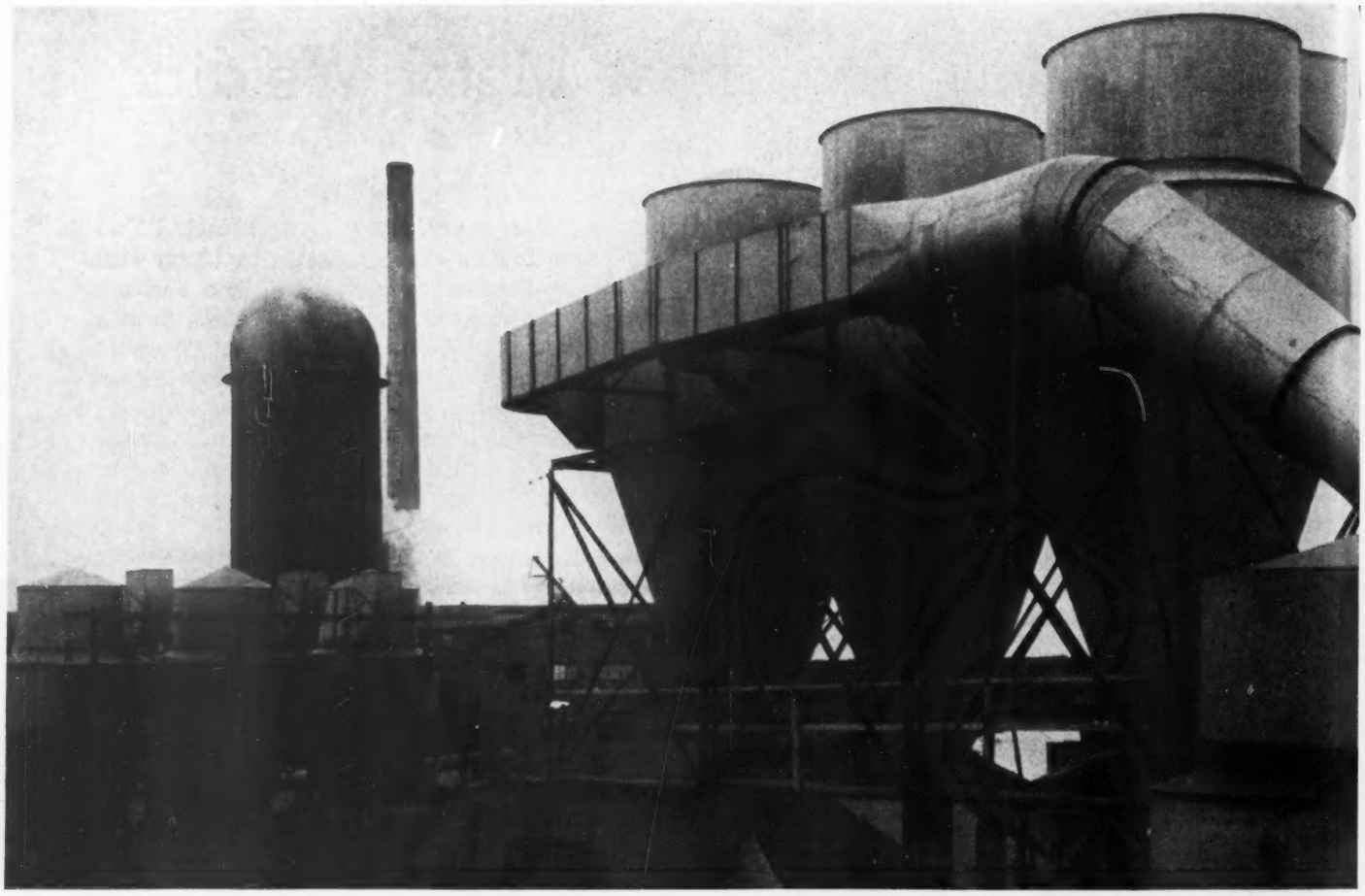
In order to reduce setting-up time to a minimum and to increase the uniformity of results, the special clamping device shown in the accompanying illustrations is used. This device or jig consists of two ¾-in. thick base plates bolted to the top of a planed cast iron work table. Two grooved clamping blocks operated by levers with a cam action rest on each base plate and are attached to it by threaded studs which have a ½-in. clearance for vertical adjustment. The stud openings in the clamping block are slotted so that a ½-in. horizontal adjustment can be obtained and the clamping block positioned at any desired angle. In addition to holding the lengths of sheet-metal angles securely in position for welding, the clamping blocks serve also to carry away the heat of the welding flame.

During the welding operation sheet metal frame sections are clamped in the jig with their mitered corners butted together. Steel backing-up bars first are placed beneath frame sections in the square grooves in the base plates, arranged so that there is a clearance between the backing-up bars at the point beneath the mitered joint that is to be welded. In this way the frame sections are well supported for a considerable distance without there being any direct contact between the steel backing bars and the joint that might interfere with full penetration of weld metal. A second steel bar is placed on top of the outer flange of each frame section and beneath the clamping block to give a tight fit and extend the clamping action over a large area.



Closeup of the clamping device showing cam levers in the open position. The clamping blocks provide a ½-inch clearance for vertical adjustments and are slotted for ½-inch horizontal adjustments in different directions.

*Reprinted from *Oxy-Acetylene Tips*, September, 1941.



High Efficiency Collectors Solve Wood Board Dust Nuisance

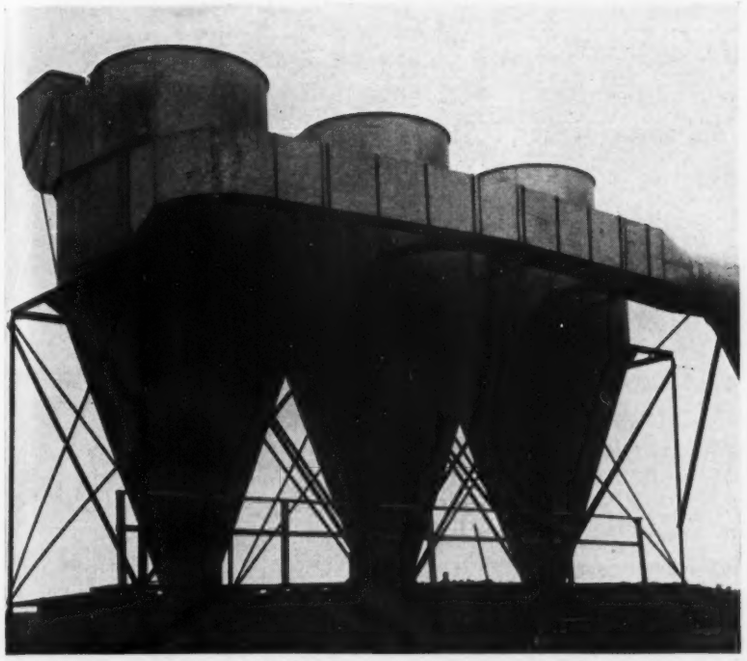
By C. A. McElevey
The Day Company, Minneapolis

THE Wood Conversion Company, Cloquet, Minnesota, manufacturers of various types of pulp wood insulation board, have, together with other companies in the same industry, suffered for a number of years with a dust problem in connection with the insulation board finishing department.

The insulation board or new wood, as the trade terms the product, arrives in the finishing department from the board driers in large sheets. Through the production facilities of the finishing department machinery, the board is cut into various standard sheet sizes, as well as innumerable types of tile shapes. All of these operations are accomplished through comparatively high speed automatic gang saws, tile edgers, sanders, etc.

In passing through the various machines in the finishing department, a very large amount of very fine dust is created. Following usual practice, as much of this dust as possible is picked up through machine hoods and a connected exhaust system ending at outdoor collectors. This dust collecting system has been built piece-meal as demand required—the result being a bad dust condition in the working spaces and poor efficiency in the collecting system. The house-keeping problem was also expensive.

Equally difficult was the problem of extracting the dust from the air stream to prevent neighborhood complaint. The collectors used seemingly were not able to extract the fine dust, of low specific gravity, so a dust nuisance existed. In



The three collectors shown on this page and in the foreground of the picture facing are connected to the finishing department and collect the dust which former collectors plus a washer had not separated. The Day Company has seven collectors in operation (as shown) and will shortly install seven more for other departments.

◆

an effort to get the dust out of the air stream, the air from the collectors was passed through multiple bank washers to wash the dust out of the air.

This arrangement left much to be desired. Because of the size of the operations, the volume of air handled through the collectors is tremendous; the plant is located so that complete dust elimination is essential and in winter, in Cloquet, some serious difficulties were encountered with freeze-ups in the washers, shutdowns because dust could not be controlled, and so forth.

At this stage in the problem the Day Company, Minneapolis, engineers, contractors, manufacturers of dust control systems and equipment, suggested that more efficient cyclones could solve the problem, suggesting, quite naturally, their own Dual-Clone collectors. Looking much like other cyclones, the Day unit employs cyclonic principles to obtain a continuous air flow and an internal skimmer arrangement in the outlet stack which provides two-stage separation without returning any air to the fan. The unit has low resistance and practically complete elimination of internal eddy currents.

Three collectors were installed to replace the cyclones and the washer. These three collectors handle 36,000 cfm and by test are removing 80 per cent of the dust formerly discharged by the washer without the washer complications. In all, seven of these collectors are now in use connected to machines in the finishing department, and seven additional collectors are now being fabricated for use in eliminating the dust nuisance in other departments of this same plant.

The point of interest, of course, is that suitable collectors properly engineered for the material to be handled, installed in systems which are also properly engineered for the installation, can eliminate dust nuisance which poor collectors plus washers cannot satisfactorily cope with.

Drying Packaged Fuel (*Continued from page* 39)

There is moisture between the particles of fuel before moisture is added in the mixing and this also has to be removed. About 12 ounces of moisture are dried out of each package of fuel and this makes a drying time of from 24 to 27 hours. As the dryer has a capacity of three days' run, the fuel is quite dry when removed.

Twice as much water is added to the coal screenings as the coke screenings, consequently the coke screenings will dry in a much shorter time.

As the packages are wrapped in paper and sealed before being dried, the actual drying does not start for sometime after being put in the dryer.

Tests showed that the return air at the loading end of the dryer is cooler than the unloading end although the moisture content is practically the same.

No. 2 Exhaust..88°F..38%Rh..5.358 Gr. Cu. Ft.
No. 8 Exhaust..94°F..32%Rh..5.382 Gr. Cu. Ft.
No. 2 Exhaust..86°F..31%Rh..4.114 Gr. Cu. Ft.
No. 8 Exhaust..92°F..26%Rh..4.118 Gr. Cu. Ft.

Construction of the dryer is very important and insulation plays a very important part in the time requirement. The exposed walls and roof should be well insulated.

The furnace should have automatic control so that a sufficient amount of heat will be developed at all times and the furnace not become overheated. This can be accomplished in several ways, but since broken packages are used as part of the fuel, a draft control set controlled from the bonnet temperature is the best.

Researches for Improved Solder Fluxes*

By Howard Peters and Bruce Gonser, D.Sc.

Tin Research Sponsorship, Battelle Memorial Institute, Columbus, Ohio

THE search for a really non-corrosive flux that effectively prepares metals for soft soldering, is by no means new, and has not ended. Why this is such a tough problem is obvious if one considers that effective fluxing involves rapid cleaning of the metal surface to dissolve scale, oxide films and grease, in order to present a true metal to metal contact with the solder, yet the very factors that favor such action favor corrosive residues.

Zinc chloride, the time-honored flux, is effective when used with most metals, but frequently it leaves a corrosive residue, even after washing repeatedly with water. Likewise, the various inorganic and organic acids and chloride salts which are used as fluxes are often unsatisfactory as regards the non-corroding requirement. At the other end of the range of fluxes is rosin, sometimes called "the only non-corrosive soldering flux." Unfortunately, it is not an effective flux except when used on relatively clean tinplate and copper. It does not flux steel or oxidized copper, does not promote spreading of the solder, and is rather difficult to remove. Recent research, therefore, has been directed toward organic materials which are substantially non-corrosive when cold and leave water soluble residues, yet can decompose when heated during soldering, to release an active, oxide-dissolving constituent.

One of the many difficulties in developing an improved flux is to find means of testing which give results of practical value. It is not convenient to make a great many soldered joints using one flux, and to attempt to compare the strength, ease of joining, and other contributing factors, with joints similarly prepared with another flux. It is possible, however, to obtain indications of the qualities of improved fluxes by comparing certain properties, such as the effect of the flux on the surface tension, or flowability, of the solder, its effectiveness in removing oxide films, and its corrosion of the base metal. In this manner, a wide field of possible fluxes can be tested, and those which show promise can be given a more rigorous examination later.

The general procedure followed in a recent investigation for the Tin Research Institute was

(*Continued on page* 112)

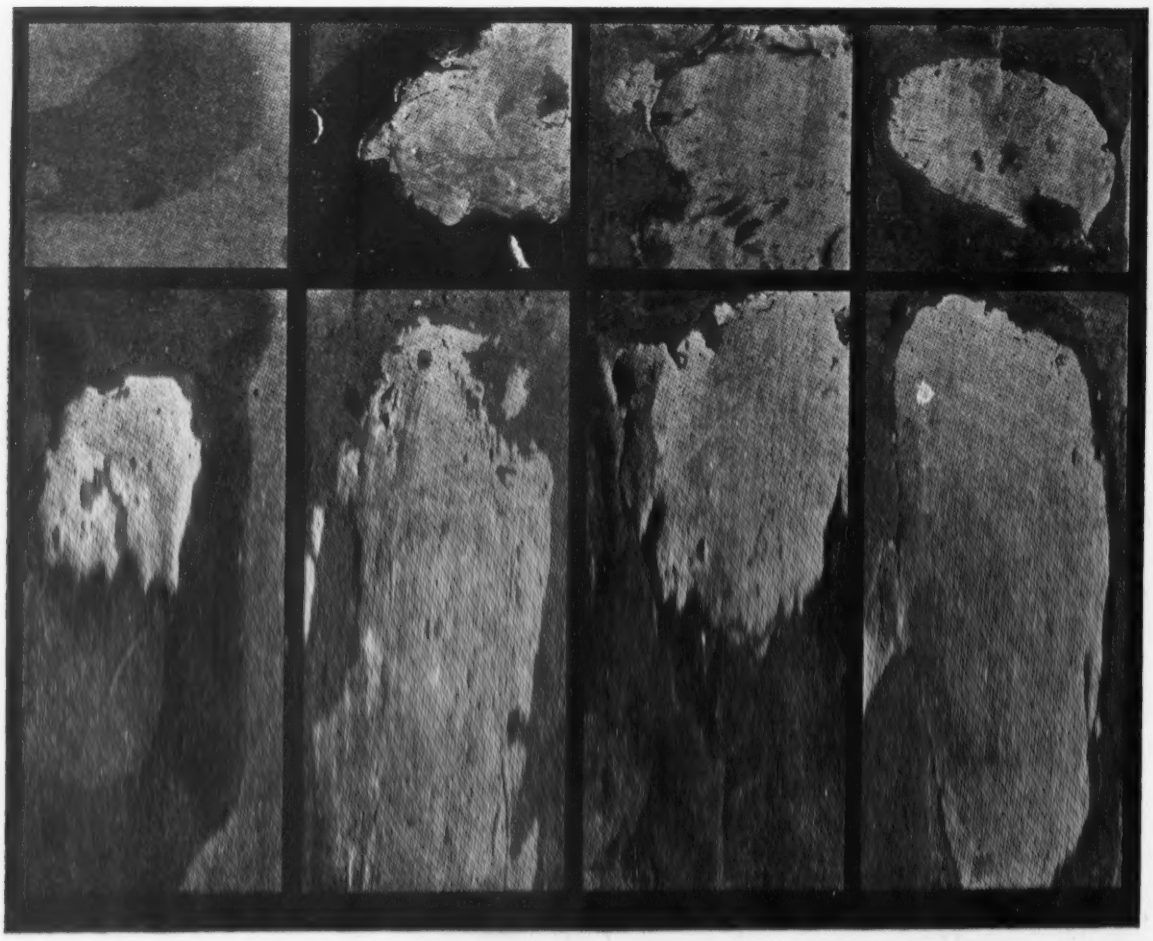
*Reprinted from *"Tin and Its Uses,"* July, 1941.

Copper test piece (about 2 in. square): showing oxidised surface

Stearic acid salt of triethylene tetramine. Note thinness of solder at edges: indicating low surface tension

Oleic acid neutralised with ammonia

Stearic acid salt of diethylene triamine. The solder spreads well: although the flux is somewhat viscous



Rosin. High surface tension or de-wetting action is evident

stearic acid salt of triethanolamine. Excellent spreading action is noticeable, even on detached droplets

Stearic acid salt of 1,4-benzenediamine

Stearic acid salt of dodecylamine

Comparative solder coverage tests, using soldering bit

An "Opposed Design" Spray Booth

SOME economy can be affected in spray both construction by using the "opposed design" shown in Figs. I and II where this design is permitted by the insurance companies and the state labor departments. This arrangement incorporates a method of paint stop and possibility of using the booths singly or together without too much waste in power for air flow when operating as a single booth.

The construction consists of small angle framework with light gauge black iron for sheathing. Light fixture wells can be cut in to suit and in some cases fire protection will be required either through standard water spray heads or special chemical or gas equipment.

Single Blade Eliminator Stops Gun Fume

The single blade eliminators prevent the direct spray gun fume from getting into the duct air system due to impingement of the paint onto the metal surface. The center damper obviously will be locked into the proper position depending on which or both booths are to be used. This damper also acts as a fume stop from one operator to the other and is fitted so that the unused booth can be blanked off from an air flow standpoint.

4-Blade Eliminator Catches Paint

The 4-blade eliminator at the top acts as the real paint remover and in the writer's experience this design has actually proven equal to any of the other types for general service. As is generally known, there are many kinds of filters used in spray booth systems including excelsior paper, wool, spray, scrubbing tower, etc., and each one may have advantages for certain types of spray booth work.

The excelsior has been used primarily from an economy standpoint, but one fire can offset a lot of filter maintenance. Where the load on the booth is heavy, a spare eliminator should be provided so that the booth will not be out of use while the eliminator is being serviced. For certain spray materials, the eliminator can be im-

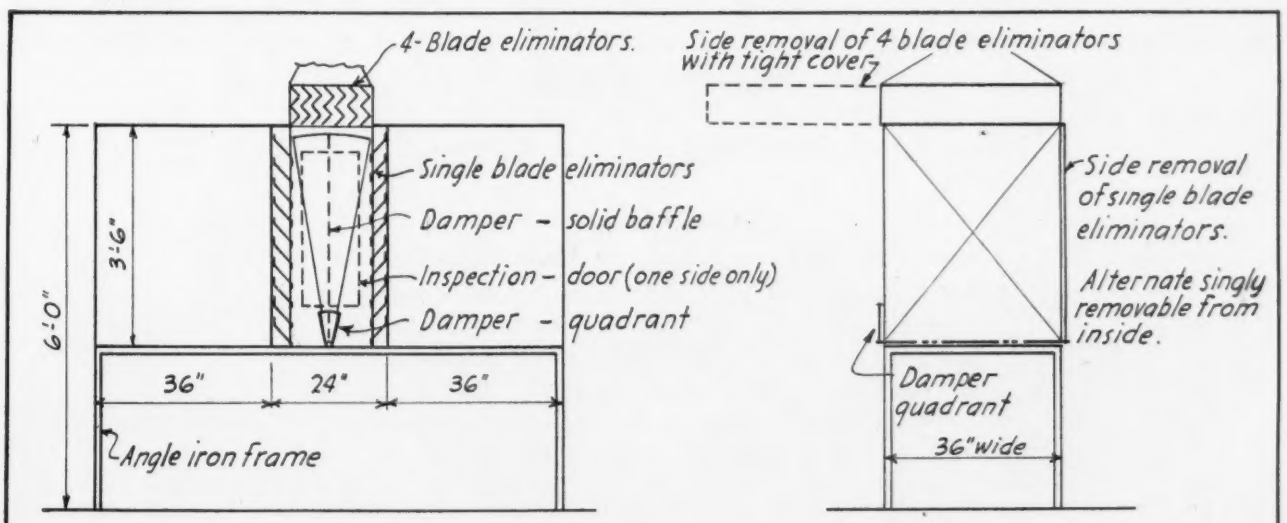


Fig. I Showing typical side view of booth

Fig. II

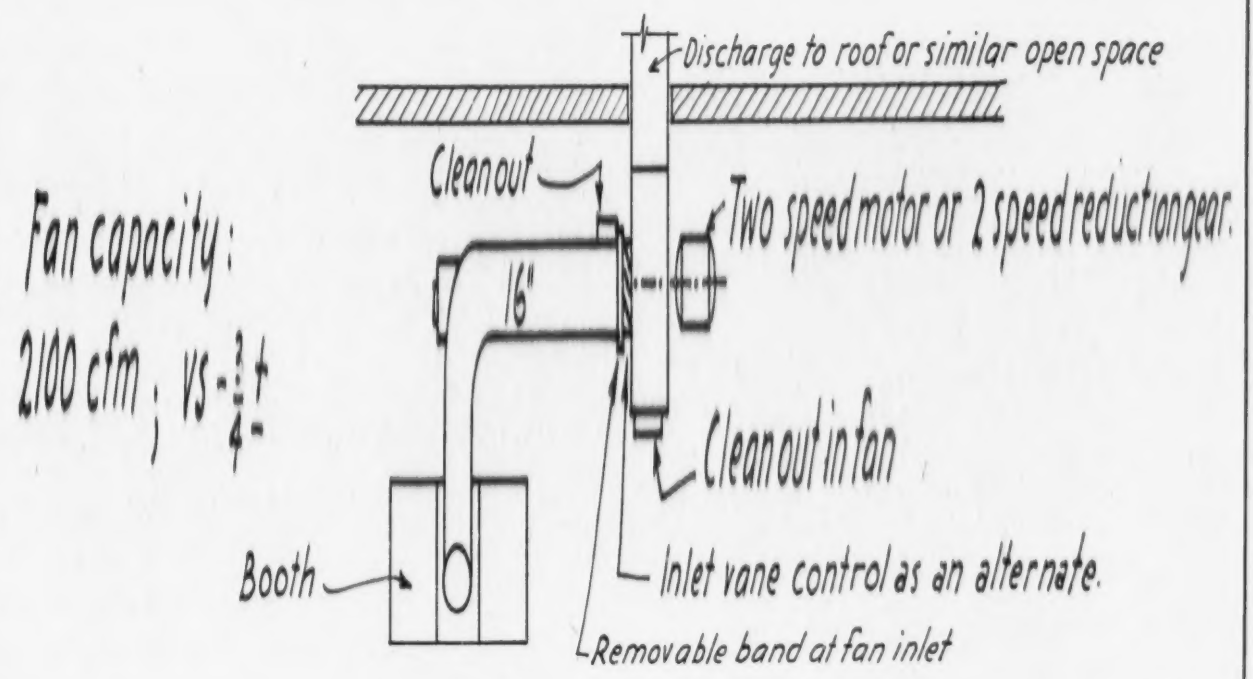

Discharge to roof or similar open space
Clean out
Two speed motor or 2 speed reduction gear.
Fan capacity:
2100 cfm ; vs - 3/4 "
16"
Clean out in fan
Booth
Inlet vane control as an alternate.
Removable band at fan inlet

Fig. III Showing diagram of piping and fan arrangement

mersed in a solvent solution and the excess deposit dissolved off rapidly without disassembly, but generally the design should allow for complete dismantlement of the blades so that each can be scraped to remove the deposit. Some success has been encountered in coating the eliminator blades with paper and in other cases greasing or oiling has proven worth while. This recovery type of paint remover from the air stream certainly shows possibilities if the paint material becomes relatively unobtainable.

Double Booth Saves Motor Power

From a power efficiency standpoint the double booth may appear to have a disadvantage under single operating conditions, but there are many ways to offset some of this possible loss. A two-speed motor driving the centrifugal type fan as shown in Fig. III will keep the power use in range if the fan is specified accordingly. There are also inlet vane controls which are offered by the reputable fan manufacturers as power savers.

Paddle Blade, Pressure Fan Suggested

The centrifugal type fan is suggested for this type of service because very few people properly service this kind of equipment and, as a result, non-pressure type fans often operate at considerably reduced air flow, a greater part of the time. It is not recommended to use a small blade centrifugal fan wheel as these will eventually be coated with paint with a resultant capacity loss. However, there are many centrifugal wheels with reasonably large blade design and low pressure characteristics which will fill the bill.

Fig. III shows a diagram of the piping and fan arrangement. The air flow will depend on the service requirements, but an average condition would provide for 100 fpm velocity at the booth entrance which would require a fan of 2100 cfm. Obviously 200 fpm would better protect the operator from paint fumes, but the heat load and drafts would have to be reckoned with this case.

Bend Allowance Table-30 to 8 Gauge; 1 to 5 Bends

By William E. Sasak

The Riester & Thesmacher Company, Cleveland

Most fabricators accustomed to manufacturing sheet metal items have Bend Allowance Tables developed for their operating methods and machines. This table has been set up in a shop fabricating a wide variety of specialties in many materials on numerous machines. The table should be useful to any shop not having similar table of its own.

THE purpose of the bend allowance table as illustrated is to take care of the stretch in any type of metal when it is formed to any required shape.

This bend allowance table can be used for any type of metal, namely steel (hot or cold rolled), stainless steel, brass, bronze, aluminum or copper. Although not absolutely accurate, it is used in the manufacture of metal furniture, industrial switch boxes, etc., where minute accuracy is not required.

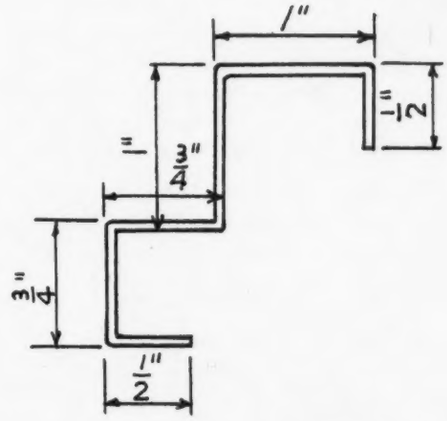
In explaining this so-called "stretch" as mentioned in the first paragraph, let us say that we wish to have a 90 degree angle, formed out of No. 16 gauge steel with each leg of the angle to be 1 inch long. If we take a flat piece of metal 2 inches wide and strike a bend line in the center of the strip we will have an angle with each leg $1\frac{3}{4}$ inches long after it is formed to 90 degrees. But if this same piece is cut $1\frac{29}{32}$ inches wide, with the bend line in the exact center of the strip, the angle then will form with each leg 1 inch wide.

It must be remembered that these allowances are to be used only when forming a 90 degree angle or where a "V" type forming die is used. In forming a piece that requires a flange formed at a 45 degree angle, take the thickness of metal

BEND ALLOWANCE TABLE
GIVING FRACTIONAL & DECIMAL THICKNESS & BEND ALLOWANCE

GAUGE	U.S.STD. SHEET		1-BEND		2-BENDS		3-BENDS		4-BENDS		5-BENDS		GAUGE
8	11/64"	.1644	1/4"	.257	1/2"	.515	3/4"	.773	1"	1.031	1 1/4"	1.289	8
10	9/64"	.1345	7/32"	.210	7/16"	.421	21/32"	.632	7/8"	.843	1 3/32"	1.054	10
11	1/8"	.1196	3/16"	.187	3/8"	.375	9/16"	.562	3/4"	.750	15/16"	.937	11
12	7/64"	.1046	5/32"	.164	5/16"	.328	15/32"	.492	5/8"	.656	25/32"	.820	12
13	3/32"	.0897	1/8"	.140	1/4"	.280	3/8"	.420	1/2"	.560	5/8"	.700	13
14	5/64"	.0747	1/8"	.117	1/4"	.234	3/8"	.351	1/2"	.468	5/8"	.585	14
16	1/16"	.0598	3/32"	.093	3/16"	.187	9/32"	.281	3/8"	.375	15/32"	.468	16
18	1/20"	.0478	3/32"	.075	3/16"	.150	9/32"	.225	3/8"	.300	15/32"	.375	18
20	3/80"	.0359	1/16"	.056	1/8"	.112	3/16"	.168	1/4"	.224	5/16"	.280	20
22	1/32"	.0299	3/64"	.046	3/32"	.092	9/64"	.138	3/16"	.184	15/64"	.230	22
24	1/40"	.0239	1/32"	.037	1/16"	.074	3/32"	.111	1/8"	.148	5/32"	.185	24
26	3/160"	.0179	1/32"	.028	1/16"	.056	3/32"	.084	1/8"	.112	5/32"	.140	26
28	1/64"	.0149		.023		.046		.069		.092		.115	28
30	1/80"	.0120		.018		.036		.054		.072		.090	30

Fractional allowance in above table is close enough for general use.
Decimal allowance may be used on work
where minute accuracy is essential.

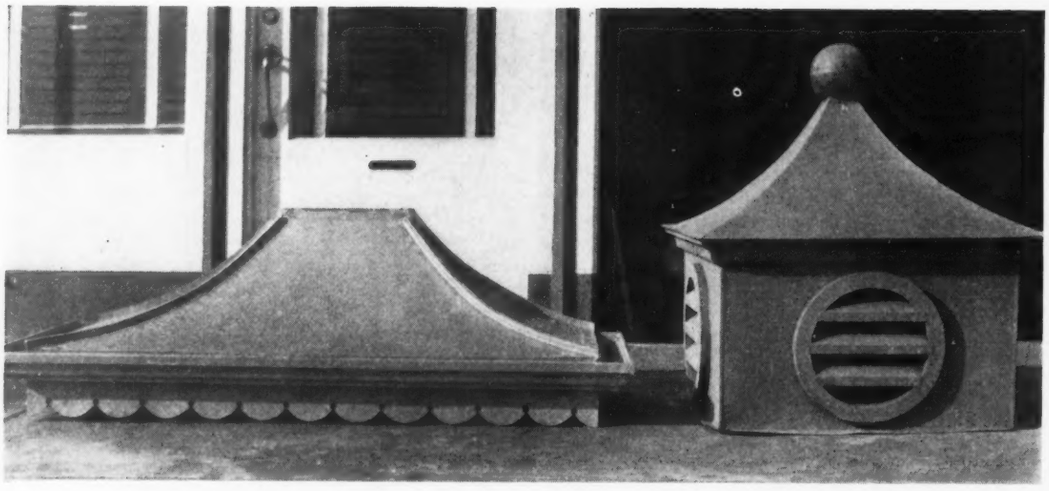


The sum of outside dimensions
$\frac{1}{2}" + \frac{3}{4}" + \frac{3}{4}" + 1" + 1" + \frac{1}{2}" = 4\frac{1}{2}"$
Minus 5 Bends, #16 Gauge
$4\frac{1}{2}"$ Minus $\frac{15}{32}" = 4\frac{1}{32}"$ Blank

into consideraton and allow only *half* the required allowance. For any other degree that is over or under 90 degrees it is a matter of judgment and experience as to what to allow for the bend. When taking a flat piece of metal and forming it over to double its thickness, which is commonly known as a flat fold or hem, you do not allow anything for this type bend. In other words, you take the two sides and total them together to determine the cutting size of the flat strip.

The bend allowance that is illustrated is figured for metal up to No. 8 gauge. The bend allowance for any metal thicker than No. 8 gauge will be one and one-half times the thickness of metal. For example, a ¼-inch plate should have an allowance for each bend of ⅜ inch.

In using these bend allowances, the over-all dimensions of the required flanges must be figured as illustrated on the sketch in the bend allowance table.



Decorative Specialties for Houses

"BRIGHTEN up bareness for more business," is a slogan which has brought profit to Slauson Avenue Sheet Metal Works, 1863 West Slauson, Los Angeles. This firm was looking around for some specialty item a few years ago and hit upon an idea which now represents a small but important proportion of manufacture. Decorative metal specialties have grown to such an extent that standardization has been applied, with consequent lowered production costs.

The idea, in brief, consists of supplying sheet metal cupolas, pergolas, pilasters, and lintels. These are used for decorative effect, brightening up exteriors of small homes, cottage courts, auto courts, garages, and business properties.

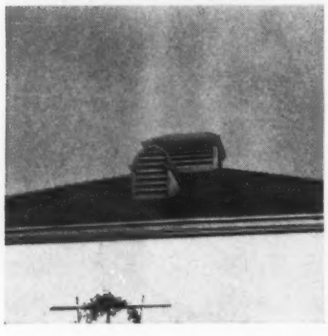
That there is a market for these articles which can be applied to finished structures, giving them improved appearance when remodeling, or used in new building where the objective is to dress up the structure at low cost, has been proved by the experience of this firm. When production was first undertaken on the articles it was thought that they would amount to only a small sideline, so no attempt was made to push them except through display on the busy boulevard running past the establishment. But demand proved brisk from the beginning so a definite campaign of selling was laid out.

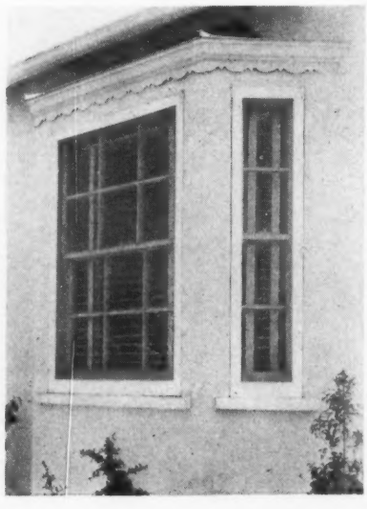
Pictures were taken of the items and included in the kit which the salesman uses when calling on contractors and architects. After these were shown to a few of the trade, builders began to see the possibilities in using the items and, of course, after they were used by a few architects and contractors it became a matter of course that these would be used for certain types of jobs.

The most important item in the line has proved to be a 4 ft. 6 in. canopy of 26-gauge sheet iron to be used above doorways of small homes of the modern, porchless type. A quantity of these are also being used on courts, many of which

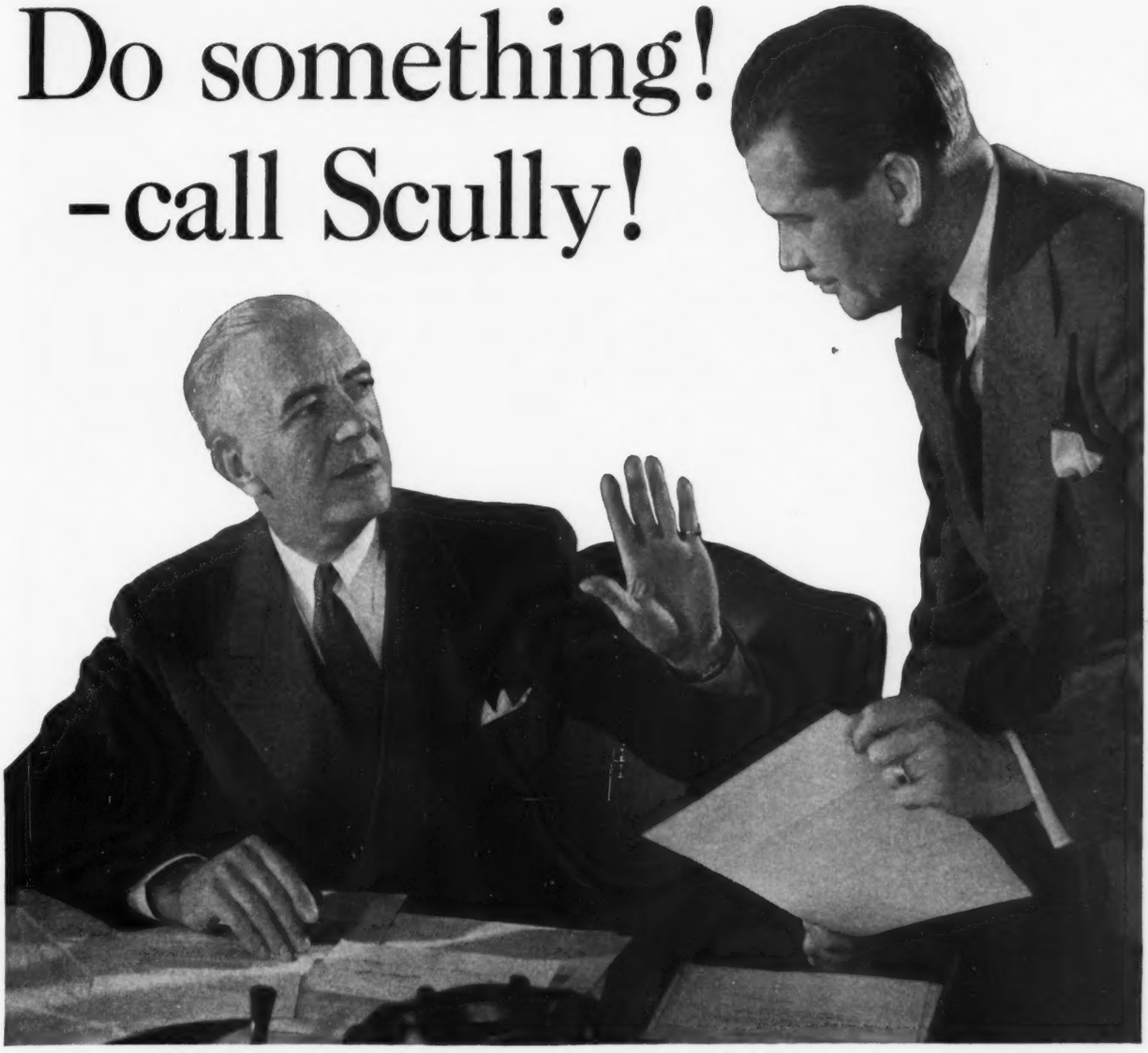
(*Continued on page* 114)

The photographs show canopies and cupolas of standard Slauson design and "special" moulding board, dormers, etc.





Do something! -call Scully!



IF you're in a jam for steel, give us a ring. We can't, under present conditions, promise you *all* you need, but you'll get a quick, courteous answer—and prompt delivery of what we have. Every one of our eight warehouses is working night and day to maintain the kind of service that has made the Scully name famous. If you need steel, steel products, copper, brass, tools, equipment or machinery, write, wire or phone the nearest Scully warehouse. We'll cooperate to the best of our ability. If you don't have a copy of our handy Stock List & Reference Book, ask for one—it's free.

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Installing ducts in 600 homes in the Defense Housing Project at Turtle Creek, Pa., as well as other important defense jobs, Triangle can't afford to waste time with sheet metal screws that give trouble. The kind of screws that won't hold because they're undersize . . . that go in hard because they're oversize . . . that spin around because they're not threaded to the head . . . that break when drawn up tight.

Triangle and hundreds of other leading sheet metal shops know it is economy to pay a little extra for Quality-Controlled Parker-Kalon Screws. They know that the Parker-Kalon Laboratory checks everything from raw material to finished product to make sure every P-K Screw is a *good* screw.

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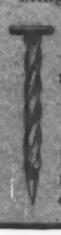
Sizes and head styles for assembling light and heavy sheet metal.



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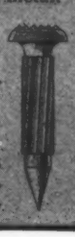

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Association Activities

National's 28th Annual Convention

The 28th Annual Convention of the National Warm Air Heating and Air Conditioning Association, will be held at the Benjamin Franklin Hotel, Philadelphia, on January 26th, 27th and 28th, 1942.

Many of the increasing problems of the Warm Air Heating Industry created by the National Emergency can, we believe, be most satisfactorily discussed and answers given, at the forthcoming 28th National Convention.

C. A. Olsen, President of the Association, will open the Convention with the President's address on the opening day, Tuesday, January 27th.

There will be a morning session on the opening day of furnace, register, pipe and fittings, blower, humidifier, filter and other allied manufacturers for the purpose of considering the problems of the industry. At the conclusion of the manufacturers session, representatives of various departments of the Government will carry on the program.

We hope that Leighton H. Peebles, Chief of the Plumbing and Heating Branch of the Division of Civilian Supply of OPM can accept our invitation to personally address our Convention. As Chief of the Branch, Mr. Peebles is Chairman of the Plumbing and Heating Industry Defense Advisory Committee and is in a position, therefore, to give the manufacturers of the industry a broad outline of how the government and the industry can best cooperate during the National emergency. We will also have on our program representatives of the Contract Distribution Service, headed by Floyd B. Odlum, Defense Housing Critical List of Materials, headed by Sullivan Jones and a representative of Priorities and Allocations, headed by Donald M. Nelson.

W. L. McGrath, member of the Plumbing and Heating Industry Advisory Committee has been asked to address the Convention. It has not yet been decided if he will present his talk at the morning manufacturers meeting or at the afternoon meeting of the opening day.

The second day of the Convention will be devoted to technical subjects in general. Professors Kratz and Konzo, F. G. Sedgwick, Chairman, Research Advisory Committee, and W. D. Redrup, Chairman, Codes Committee, will appear on the morning program. On the afternoon of the second day there will be a joint meeting of the members and guests of the American Society of Heating and Ventilating Engineers and the National Warm Air Heating and Air Conditioning Association. Speakers and subjects for the afternoon session have not yet been completed.

We send every manufacturer, jobber, and dealer our most cordial invitation to attend our 28th Annual Convention. Make your plans now to attend. Complete details of Convention program will be available soon.

George Boeddener, Man. Dir.

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Chicago

The Furnace, Air Conditioning, Sheet Metal Institute, Chicago, helped establish a class in sheet metal pattern drafting several years ago at the Schurz evening school. The purpose was to make available, under the direction of a very capable instructor a worthwhile course in sheet metal pattern drafting.

With the defense work and overtime coming up now, Instructor Hansen is having a hard time keeping the class up to the required number. Members are asked to urge their men to take this course so it can continue.

Louis Drehobl, President.

REMA All-Industry Show

The Refrigeration Equipment Manufacturers Association, 43 E. Ohio St., Chicago, will hold their fourth All-Industry exhibition at the Stevens Hotel, Chicago, January 12-15 inclusive. The exhibition will show the industry's part both in military defense and in civilian defense. The Board of Directors believe that the All-Industry show can perform an unusually timely service for refrigeration by dramatizing what it has been doing, now is doing, and can do for the well-being of the citizenry —military as well as civilian.

E. W. Vallee of Milwaukee, president of REMA invites members of the trade to "Come to the All-Industry Show to see what we have done for national defense by saving essential materials and simultaneously improving our products."

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Florida

Since the convention in Jacksonville in April, interest in the Roofing & Sheet Metal Contractors Association of Florida has increased and membership is increasing.

Members of the association have been invited to attend the Annual Business Conference and Silver Anniversary membership meeting of the Florida State Chamber of Commerce on December 1 and 2, 1941, at Panama City. "Florida—a United State" is the theme selected.

The L. J. Mueller Furnace Co. has added its name to the list of manufacturers supporting this association. The Ruberoid Co. through Pettus E. Lee of Orlando has renewed its membership.

Plans are in the making for the 1942 convention.

L. A. Burgess, Secretary-Treasurer.

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Henry C. Bitter Resigns

Henry C. Bitter has resigned as secretary of the Toledo Sheet Metal and Roofing Contractors' Association, Inc., after serving since March, 1936.

Mr. Bitter was active in preparing the code for warm air heating for the city of Toledo. He has attended state and national meetings of the various air conditioning, heating, ventilating and sheet metal associations and has participated in the discussions for the improvement of the services offered by these groups. Recently he helped to organize an association in Pontiac, Michigan. On June 2nd, Mr. Bitter talked before the Milwaukee association about the activities in general in Toledo.

Mr. Bitter's present home is in Curtice, Ohio.

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Furnace Manufacturers

About October first the Office of Production Management, Division of Civilian Supply, Washington, D. C., mailed out form OPM 173 to furnace manufacturers. This form was to be filled out and returned by October 15 to the Durable Goods Section, Division of Civilian Supply, Office of Production Management, Washington, D. C.

The form covers unit and dollar sales for the period from January 1, 1940, to July 1, 1941. It also covers short tons of iron and steel consumed for the above period.

If you have not mailed in your copy of this form you may be penalized **when and if** an allocation program is set up for furnace manufacturers. Therefore, if for some reason you have not filled out this form we suggest that you do so at once and if you do not have a copy write for it by addressing the Durable Goods Section above referred to.

Geo. Boeddener, Managing Director.

(Continued on page 92)

New Products

For your convenience a number has been assigned each item. Circle the items in which you are interested on the coupon on page 91 and mail to us.

● Indicates product not listed in 1941 Directory.
△ Indicates manufacturer not listed in 1941 Directory.

△191—Cleans A.C. Equipment

Spee-D Chemical Systems, 622 Broadway, Cincinnati, Ohio, announces a chemical system for fireproofing and cleaning air conditioning systems, grease ducts, chutes, exhaust fans and other kitchen equipment. Into the systems, grease ducts, chutes and fans, they blow, spray or force by compressed air blowers a measured quantity of their powdered chemical formula. The chemical dissolves or changes the existing grease (vegetable) and takes it through the exhaust system. The chemical then takes hold to the walls of the ducts, the blades of the fan, etc., and remains there for an indefinite period of time with the same reaction to grease.

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192—2-Speed Fan Control

Perfex Corporation, 500 W. Oklahoma Ave., Milwaukee, offers a new furnace fan control for forced warm air systems employing two-speed fans. The greater range of air delivery ob-

tainable with two-speed fans produces minimum variation in temperature of air delivered to rooms and produces faster heating. The switching system is designed to start the fan on temperature rise and only on low speed, in order to protect the fan motor.

The control can be set to switch the fan from low to high speeds at any desired bonnet temperature. All cut-in and cut-out settings are made independently. Bonnet temperature is indicated on an external scale.

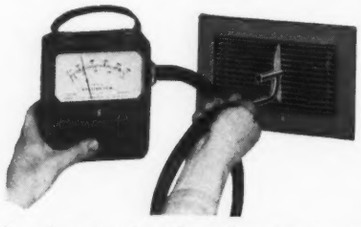
Turning the external knob to the "summer cooling" position produces continuous high speed fan operation without disturbing temperature settings.

193—Exhaust Grille Jet

Illinois Testing Laboratories, Inc., 420 N. LaSalle St., Chicago, offers a new intake air exhaust grille jet, developed for use with the Velometer. This jet has two calibrated air intake openings. One of these calibrated openings is at the end of the main

member. This member forms a compensating tube and extends from the grille face outward from or beyond the critical suction zone, i. e. the zone where the air pressure changes most rapidly from static to velocity.

At right angles to this main member is a branch tube also calibrated to which is attached the flexible tube connecting the jet to the velometer.



The air actuating the velometer movement is inspirated through this branch tube by the force of the suction exerted upon the main member or compensating tube.

This intake jet is offered in two sizes—low velocity of ⅝ inch OD tubing for full scale ranges of 0 to 1000 fpm and high velocity of ⅜ inch tubing for scale ranges 0 to 2500 fpm and higher.

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△194—U-C Level Indicator

U-C Level Indicator Sales, Division of Marketing, Inc., 301 Underwriters Exchange Building, 828 North Broadway, Milwaukee, has patented a new U-C Level Indicator for 55-gallon drums. The U-C consists of a cork float mounted on wire rods, the level of which is indicated on a dial gauge installed on the external fitting fashioned to receive the faucet or spigot.

195—Thermostats

Minneapolis-Honeywell Regulator Company, 2726 Fourth Avenue South, Minneapolis, announces two new thermostats of horizontal design.

These thermostats are available in two types, one for heating applications, the other for heating and/or cooling.

The horizontal design provides maximum air circulation and greatly reduces the effect of contact heat. The new M-H Con-Tac-Tor Snap-Switch provides the switching action.

This is a non-magnetic switch, self enclosed to protect it from dirt, dust, moisture and grime. Another distinctive feature is the temperature setting knob which can be removed to lock the thermostat in order to prevent unauthorized tampering. Models are also available with a "positive on" feature for cooling applications.

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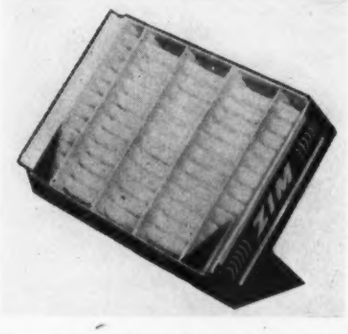
△196—Zim Air Filters

R. F. Zimmerman Co., Oakley Sta., Cincinnati, Ohio, offers a new principle air filter for gravity heating systems. Strips of tough glass fibre



are set at scientifically determined curves in a frame.

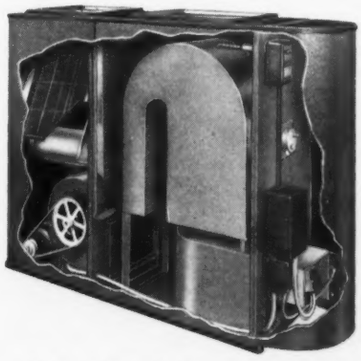
The Zim filter is placed in the cold air return duct where the air velocity is low. They are cleaned by tapping them against the floor and are designed to be efficient for a heating season.

New Products . . . . . .

For your convenience in obtaining information regarding these items, use coupon on page 91.

197—Defense Conditioner

The H. C. Little Burner Co. of San Rafael, California, offers a winter air conditioning unit suited to defense homes because of its low first cost and low upkeep. It has a 77,000 Btu output at the bonnet and burns No. 3 furnace oil or 27 deg. Diesel.



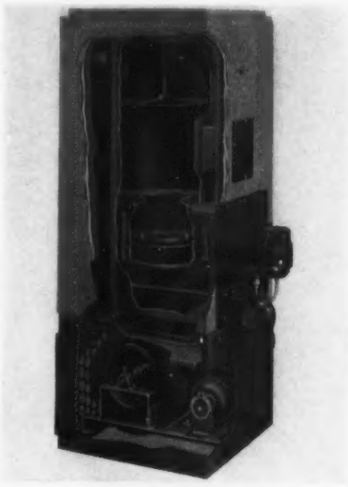
Outstanding feature of the unit is its vaporizing burner with electric ignition and completely intermittent operation. The burner contains no moving parts. Two large spun glass filters clean the air and circulation is provided by a multi-vane blower of 1000 cfm capacity.

◆

198—Low-Cost Oil Furnace

D. W. Russel, President, Airtemp Division, Chrysler Corporation, Dayton, Ohio, offers the new Vapor-flame furnace—24 in. square by 65 in. high—in three models, all rated at approximately 60,000 Btu output, priced for homes costing $6,000 and under.

All models provide automatic heat. Model EO-6 is built for gravity air circulation; Model EO-7 is equipped



with a humidifying pan and a propeller-type fan for forced circulation of moist, warm air; Model EO-8 has a centrifugal fan, air filter and humidifying pan for complete winter air conditioning.

Airtemp's new furnace incorporates a high-low flame, vaporizing oil burner.

Cabinets are finished in two shades of green crinkle enamel, Bonderized inside and out against rust and corrosion. Another feature is the triple insulation. The heating chamber is of heavy, 16-gauge, hot-rolled steel, seam welded.

Controls consist of a small Airtemp room thermostat, combination fan and limit switch on the forced air models, internal wiring, switch assembly and a primary oil control for automatic operation of the burner.

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● 199—Furnace—Water Heater

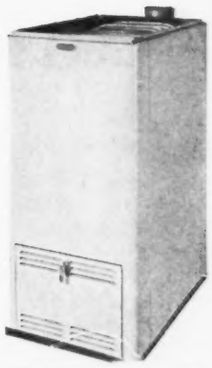
Evanair Division, Evans Products Company, Detroit, announces a new Evanair combination furnace and water heater as a single unit.

The Evanair Model 1000, which is no larger than a modern oil-burning furnace, supplies heat and hot water

from a single burner, a single valve and a single cabinet.

The lower half of this Evanair model is comprised of the heating unit combustion chamber and blower, while the upper half consists of the hot water tank and stack. A large spring-mounted fan is installed at the bottom rear to force the heat out through louvers at floor level.

The Evanair Model 1000 is equipped with controls which make it a completely automatic hot water heater and semi-automatic furnace.



200—3-Stage Gas Furnace

Perfection Stove Company, Cleveland, announces a new gravity-type warm air gas furnace with three-stage fire, known as the Super-comfort Superfex Sixty.

The Super-comfort Superfex Sixty strikes a new low in cost among super-comfort models—a name which has been applied to all furnaces with three-stage operation. The three stages are: high fire, which is a booster fire and uses two burners; low fire, which is a coasting fire and uses one burner; and pilot fire, which is a tiny jet flame.

The new furnace is 23 inches wide and 32 inches deep (39 inches with draft diverter). It has a dual multi-port burner and a large round combustion chamber with twin double pass vertical radiator. The return air opening is in a side panel, and the two side panels are interchangeable, so that the return air duct may be attached to either the right or the left side to suit convenience. The furnace is shipped as a package unit, complete with factory wired and tested automatic controls and manual drip humidifier.

Gas input is 85,000 btu.; output at bonnet, 63,750 btu.; leader pipe area 450 square inches. This rating is based on 50 per cent to first floor and 50 per cent to second floor distribution.

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201—Copper Flashing Substitute

The Cheney Company, Colonial Building, Ardmore, Pa., (faced with a serious problem when OPM ruled that no more sheet copper could be used for flashing in building construction after December 31, 1941), has developed a substitute—Pitch-On-Metal—after a great deal of experimentation and after consulting with government officials and with the Bureau of Standards.

Pitch-On-Metal consists of a ferrous metal core completely enclosed in a baked-on coal-tar pitch enamel.

Hereafter Cheney flashing will be made of copper for government usages only and will be made of Pitch-On-Metal for both private and government construction and this metal can be furnished without priorities for both defense and nondefense construction.

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Between July 1, 1940, and August 2, 1941, construction was started under FHA inspection on a total of 218,555 privately financed small houses. Of these, 94,318 were started during the last 6 months of 1940 and 124,337 subsequent to January 1, 1941. Some 70 percent has been located in the specific defense housing areas designated under Title VI. There has also been a considerable volume of construction under the FHA program in other areas where defense industries are operating and where continued building by private enterprise is essential to prevent the future development of housing shortages.

Private Building Biggest Factor

New FHA-insured dwellings represent somewhat more than 40 percent of the total privately financed single-family home construction started since the early summer of 1940. The other 60 percent, representing private building effort, concentrated primarily in the industrial regions where defense housing needs are most pressing, has been the essential prerequisite for restricting publicly financed construction in the defense housing program to emergency situations outside the scope of privately financed operations and to relatively small proportions of the total volume of residential building.

Thus far, funds totaling approximately $442,000,000 have been made available by Congress for federally financed defense housing projects. This total includes $290,000,000 for projects constructed under the Lanham Act, $100,000,000 appropriated in Public Act 781 for construction for the Army and Navy, $20,000,000 for temporary housing (dormitory units and trailers, etc.), and funds recaptured by the United States Housing Authority and used for defense housing purposes.

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Volume of Allocations

By August 2, funds had been allocated for 109,688 regular family dwelling units, with these allocations covering most of the funds available for publicly financed defense housing construction under existing legislation. Of these allocations, 78,465 dwelling units had been placed under construction contract by that date. The number of completed units did not begin to assume large proportions until the current summer. By August 2, a total of 25,954 federally financed family dwelling units had been completed.

In this phase of the program, 49,515 of the 109,688 family dwelling units allocated by August 2 were for civilian workers in private defense industry, 19,201 were for civilian workers in government plants, 10,642 were for other civilians employed by the Army and Navy, and 30,330 were for married enlisted personnel of the Army and Navy. In addition, funds have been allocated for 4,154 trailer units, of which 1,675 were on hand on August 2, and for 9,591 units or single persons, of which 7,124 units were under construction contract on August 2, and 3,670 had been completed.

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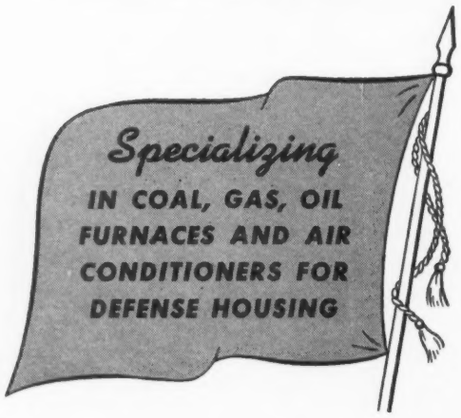

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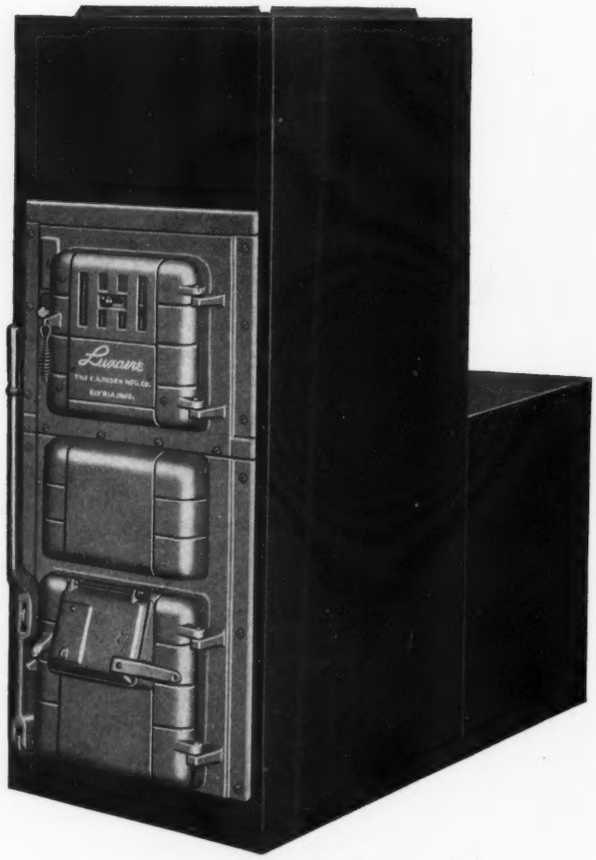

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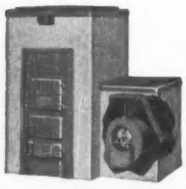

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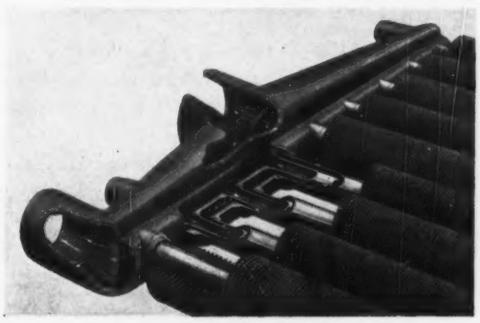

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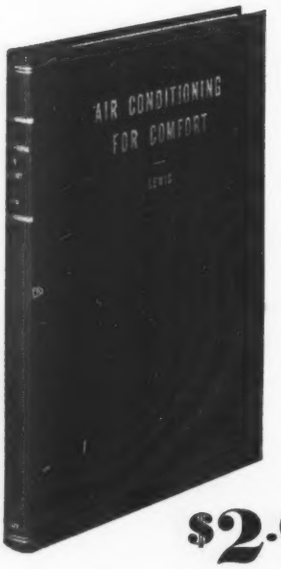

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The Third Edition
of Samuel R. Lewis'

"AIR CONDITIONING FOR COMFORT"

288 Pages—6¼" x 9¼"—Illustrated—
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Here is a book that presents—in simple, readily understandable form—every kind of information necessary for an accurate and thorough knowledge of air conditioning principles, equipment, and practices. Written by S. R. Lewis, a widely-known consulting engineer who has been active in air conditioning work for more than thirty years, it deals with all angles of the air conditioning subject from the practicing engineer's viewpoint. The designing procedures explained in the book are, for example, in every detail the same procedures employed today by the author's own organization.

Featuring this third edition are several entirely new chapters on phases of the subject not previously treated, including noise control, air conditioning measurements, air conditioning standards, fire protection codes and operating suggestions. Brand new designing examples are also used, together with new forms for recording the design data, the proper filling-in of which is explained step-by-step.

The chapter devoted to Psychrometry presents nineteen different formulas for psychrometric calculations. In illustrating the correct use of these formulas, Mr. Lewis applies both the psychrometric tables and chart in order to render both devices thoroughly understandable. The chart used in this edition is less complex than the one used in his previous book.

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10" x 16" Psychrometric Chart..Inside Back Cover

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STREET .....

CITY & STATE.....

Defense Savings Pay-Roll Allotment Plan

How company heads can help their country, their employees, and themselves

voluntary pay-roll allotment plan

helps workers provide for the future

helps build future buying power

helps defend America today

This is no charity plea. It is a sound business proposition that vitally concerns the present and future welfare of your company, your employees, and yourself.

During the post-war period of readjustment, you may be faced with the unpleasant necessity of turning employees out into a confused and cheerless world. But you, as an employer, can do something *now* to help shape the destinies of your people. Scores of business heads have adopted the Voluntary Pay-roll Allotment Plan as a simple and easy way for every worker in the land to start a *systematic* and *continuous* Defense Bond savings program.

Many benefits . . . present and future. It is more than a sensible step toward reducing the ranks of the post-war needy. It will help spread financial participation in National Defense among all of America's wage earners.

The widespread use of this plan will materially retard inflation. It will "store" part of our pyramiding national income that would otherwise be spent as fast as it's earned, increasing the demand for our diminishing supply of consumer goods.

And don't overlook the immediate benefit . . . money for defense materials, quickly, continuously, *willingly*.

Let's do it the American way! America's talent for working out emergency problems, democratically, is being tested today. As always, we will work it out, without pressure or coercion . . . in that old American way; each businessman strengthening his *own* house; not waiting for his neighbor to do it. That custom has, throughout history, enabled America to get things done *of its own free will*.

In emergencies, America doesn't do things "hit-or-miss." We would get there *eventually* if we just left it to everybody's whim to buy Defense Bonds when they thought of it. But we're a nation of businessmen who understand that the way to get a thing done is to *systematize* the operation. That is why so many employers are getting back of this Voluntary Savings Plan.

Like most efficient systems, it is amazingly simple. All you have to do is offer your employees the convenience of having a fixed sum allotted, from each pay envelope, to the purchase of Defense Bonds. The employer holds these funds in a separate bank account, and delivers a Bond to the employee each time his allotments accumulate to a sufficient amount.

Each employee who chooses to start this savings plan decides for himself the denomination of the Bonds to be purchased and the amount to be allotted from his wages each pay day.

How big does a company have to be? From three employees on up. Size has nothing to do with it. It works equally well in stores, schools, publishing houses, factories, or banks. This whole idea of pay-roll allotment has been evolved by businessmen in cooperation with the Treasury Department. Each organization adopts its own simple, efficient application of the idea in accordance with the needs of its own set-up

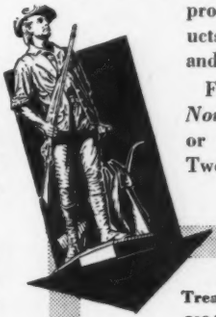
No chore at all. The system is so simple that A. T. & T. uses exactly the same easy card system that is being used by hundreds of companies having fewer than 25 employees! It is simple enough to be handled by a check-mark on a card each pay day.

Plenty of help available. Although this is *your* plan when you put it into effect, the Treasury Department is ready and willing to give you all kinds of help. Local civilian committees in 48 States are set up to have experienced men work with you just as much as you want them to, and no more.

Truly, about all *you* have to do is to indicate your willingness to get your organization started. We will supply most of the necessary material, and no end of help.

The first step is to take a closer look. Sending in the coupon in no way obligates you to install the Plan. It will simply give you a chance to scrutinize the available material and see what other companies are already doing. It will bring you samples of literature explaining the benefits to employees and describing the various denominations of Defense Savings Bonds that can be purchased through the Plan.

Sending the coupon does nothing more than signify that you are anxious to do *something* to help keep your people off relief when defense production sloughs off; *something* to enable *all* wage earners to participate in financing Defense; *something* to provide tomorrow's buying power for your products; *something* to get money *right now* for guns and tanks and planes and ships.



France left it to "hit-or-miss" . . . and *missed*. *Now* is the time for *you* to act! Mail the coupon or write Treasury Department, Section A, 709 Twelfth St. NW., Washington, D. C.

FREE - NO OBLIGATION

Treasury Department, Section A,
709 Twelfth St. NW., Washington, D. C.

Please send me the free kit of material being used by companies that have installed the Voluntary Defense Savings Pay-Roll Allotment Plan.

Name _____

Position _____

Company _____

Address _____

GPO 428498

New Literature . . . .

For your convenience in obtaining copies of new Literature use the coupon on page 91.

226—Automatic Heating Accessories

Robert Barclay, Inc., 122 North Peoria St., Chicago, is distributing their Winter 1941-1942 catalog No. 116 of automatic heating accessories—64 pages with cover, completely indexed.

◆

227—Steel Shapes

The Commercial Shearing & Stamping Co., Youngstown, Ohio, has compiled a new 16-page with cover booklet of standard steel shapes comprising drawings and data on steel shapes which are now included in their line, and which are available as production items, without die or tool charges.

◆

228—Roller-Bearing Bulletin A-325

Dodge Manufacturing Corporation, Mishawaka, Indiana, is distributing a 20-page booklet covering the Dodge-Timken double interlock roller bearings. The Dodge-Timken Double Interlock Type pillow blocks use a special duplex Timken roller bearing with long extended inner race-ring extending completely through the housing.

Selection tables are included.

◆

229—Waterproofing Materials

Primoid Products Corporation, 103 Park Avenue, New York City, offers a new bulletin describing its various rubber-base compounds designed to stop leaks or seepage through brick, concrete, stucco or other types of masonry. These Primoid products are resistant to oils, alcohol, gasoline, brine, acids and other chemicals.

These products are easy to apply and provide a durable protective coating unaffected by heat or cold.

◆

230—Heavy Duty Stokers

Kol-Master Corporation, Oregon, Illinois, is distributing Catalog No. 541, covering industrial stokers.

New features and improvements include a patented dial, which gives finger-tip control of fuel feed and fuel-bed depth. The burning rate is adjusted by setting the fan damper which controls air volume for correct coal carbonization. Settings of fan-damper and the dial are made to co-ordinate. Each operates automatically, governed by condition and requirements of the fuel-bed and load. The reverse-flight feed screw is pictured and described, as well as the dividing-plate burners.

The advantages of a stoker in the conservation of fuel, and labor are stressed.

◆

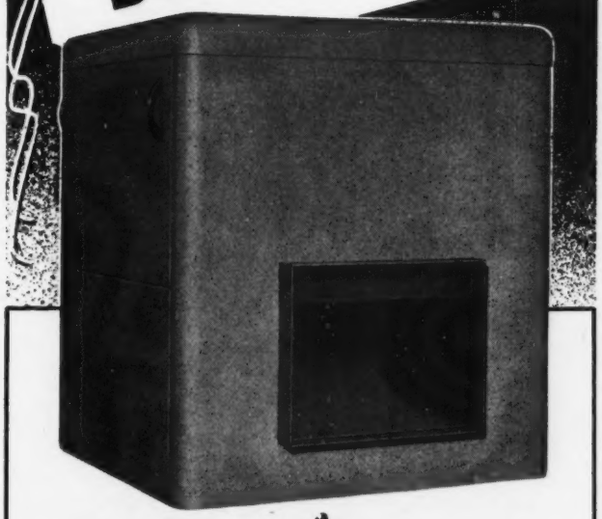
231—Effective Salesmanship

American Business Men's Service, Inc., 416 S. Lombard Ave., Oak Park, Illinois, has prepared a portfolio on "Effective Salesmanship" compiled by James R. Kaye for manufacturers, their salesmen or anyone who sells. A summary of the training includes: Essentials in Salesmanship; The Approach Simplified; Proof-Demonstration; The Closing Process; Sales Letter Writing; Public Speaking; Territorial Procedure; Personality Development; Memory Training; and Character Analysis Applied to Salesmanship.

The training is prepared for the inexperienced and as a reference work for the experienced salesman. Twelve sales manuals fitted into a "zipper" binder give the basic principles and science of salesmanship. This is a home-study course. There is a consultation service and examinations. The student sends in his study assignments each month and his work is checked, commented upon and returned with suggestions as the student may need.

S. S. Frazin, President, will send the portfolio free for inspection and study.

IMMEDIATE DELIVERIES



usAIRco **BLOWER FILTER** *Units*

YOU can order usAIRco Blower-Filter Units today with assurance of getting IMMEDIATE shipment. But if you expect to get your share of this season's furnace conversion business, *immediate action is advisable.*

Today usAIRco is taking care of its *two* best customers, Uncle Sam and you, without impairing service to either. Tomorrow, with defense needs growing rapidly and material shortages becoming more acute, usAIRco may have only one customer — and you know who!

So take advantage of the present situation while it is still favorable to both of you. Order now while you can still assure your customers of getting *"The Nation's Biggest Blower-Filter Value."*

And the delivery and price situation is also favorable on other usAIRco Heating, Cooling, Ventilating and Air Conditioning Equipment. Write us on any of your needs in these lines *today.*

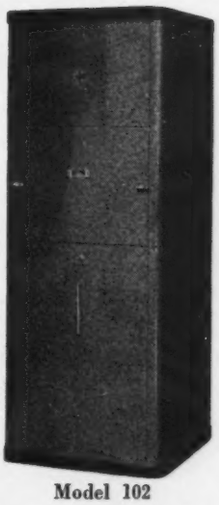
UNITED STATES AIR CONDITIONING CORPORATION

NORTHWESTERN TERMINAL · MINNEAPOLIS, MINN.

Designed for

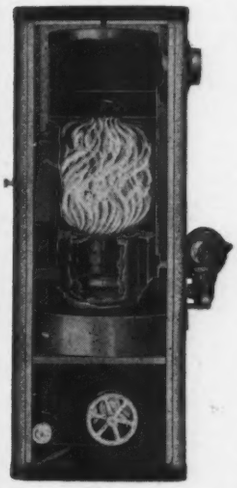
SMALL HOMES

MONOGRAM AUTOMATIC OIL BURNING FURNACES SWELL YOUR SALES VOLUME



Model 102

Small homes present an excellent chance for heating men to make extra profits. Thousands are being built all over the country and clean, dependable heat is required in every one of them. You'll be able to swell your sales volume by making a determined bid for this business in your territory and offering the MONOGRAM upright full forced air conditioning unit illustrated. Compact and highly efficient it may be installed either at floor level or in the basement with full assurance of economical performance because of MONOGRAM'S operating efficiency of over 80%. The units require only .02 draft and the blower for mechanical draft does not operate in low-fire position.



MONOGRAM VAPORIZING BURNER ASSURES TOP PERFORMANCE

This revolutionary Burner vaporizes the oil quickly and by proper mixture of both primary and secondary air produces a clean, quiet gas flame made from oil. MONOGRAM features this burner in all of its oil heating units (space heaters and automatic warm air furnaces and automatic hot water heaters) and has obtained the highest known operating efficiency. Additional information about trouble-free oil heating service that can be operated at a lower cost and with important economy is yours for the asking. Please send for it.

Write NOW *for further information*

★ ★ ★

THE QUINCY STOVE MFG. CO.

QUINCY • ILLINOIS

New Literature . . . .

For your convenience in obtaining copies of new Literature use the coupon on page 91.

232—Automatic Oil Burners

The Gould Engineering Company, 110 Brookline St., Cambridge, Mass., is distributing a folder covering Gould automatic oil burners—6 models—entitled "Step Out Ahead."

◆

233—Power Squaring Shears—Bulletin 71-H

Niagara Machine & Tool Works, 637 Northland Ave., Buffalo, is distributing Bulletin 71-A—Power Squaring Shears of the series "100," "200" and "0" with capacities up to 14 gage.

◆

234—Soldering Information

L. B. Allen Co., Inc., 6719 Bryn Mawr Ave., Chicago, is distributing a 4-page "Sodering Information" folder with a guide as to the flux to be used for various work, tarnished metal, rusty or dirty metals, difficult-to-soder metals (such as aluminum, cast iron, Monel, stainless, tinning, and copper tubing), acid brushes and scratch brushes. There is a metal sodering guide with materials to be used if metal is clean and bright, tarnished or dull, old or corroded. Another chart gives temperatures required to completely melt various grades of soder.

◆

235—Air Conditioning Service Plan

Philco Radio & Television Corporation, a Division of Philco Corporation, Philadelphia, announces two new Service Plans—refrigerator and air conditioning service.

Authorized portable air conditioning service stations will be furnished with direct factory co-operation—Philco field service engineers will conduct meetings introducing new Philco models, explaining in detail the design, engineering, operation and servicing. Service bulletins will be forwarded describing details of installation, principles of operation and technical information.

◆

236—Plan for Helping Contractors

Essick Manufacturing Co., 1950 Santa Fe Avenue, Los Angeles, manufacturers of air coolers, gas-fired furnaces, floor furnaces, and the new Oil-Mizer oil-fired floor furnace, is offering its complete line of equipment under the new Essick plan for Helping Contractors.

The plan is designed to help work out contractors' priority problems, to help them locate projects carrying priority ratings and to help them bid successfully by offering heating and cooling equipment which is being used on defense projects.

◆

237—Practical Lessons in Arc Welding

Hobart Brothers Co., Troy, Ohio, offers "Practical Lessons in Arc Welding," by W. J. Chaffee, in its third edition—100 pages, 77 illustrations, at 50c.

This book, in easy-to-understand English, offers students, instructors, engineers and executives practical arc welding data patterned after the course offered in the Hobart Trade School. Forty-two complete arc welding lessons are covered in the book.

The group of lessons includes: Striking and manipulating the arc; welding with bare electrodes; welding and cutting with coated electrodes; welding light gauge steel. Each lesson gives complete instructions for practicing the exercise—material, position, proper electrode, current value, and polarity setting. The author stresses practice as the means of acquiring welding proficiency—keeping technical material to a minimum.

GRILLES and REGISTERS PROVE SUITABLE FOR HOUSING PROJECTS

...TWO RECENT ORDERS TAKE OVER EIGHT THOUSAND UNITS

A large housing project in Pennsylvania, with 1000 houses in it, is using 6000 UNI-FIN Grilles and Registers; another in Illinois, with 300 houses, requires 2000 UNI-FIN units. UNI-FIN products are PRICED "RIGHT" for jobs of this sort and, in addition, give the valuable UNI-FIN advantages of sightliness, diffused air flow, quality construction, streak-proof design, and ease of installation. Write TODAY for special information on housing-project installations.

PRICED RIGHT!

1226 ROCK ST. BARBER-COLMAN COMPANY ROCKFORD, ILL.

New Literature . . . .

For your convenience in obtaining copies of new Literature use the coupon on this page.

238—Toridaire Air-Conditioning Furnace

Fraser and Johnston Co., 725 Potrero Ave., San Francisco, is distributing a 2-page folder illustrating and describing their Model C Toridaire air conditioning furnace. Model CR for installation in small spaces is also pictured and described, with specifications included.

◆

239—Compound Lever Shears

Bartlett Manufacturing Company, 3003 East Grand Blvd., Detroit, is distributing a leaflet illustrating and describing their compound lever shears for heavy metal cutting—snips, heavy duty shears, scroll shears, bench shears and tinner's mallets. Data and prices are included.

◆

240—Air Reduction Welding Procedures

Air Reduction, 60 E. 42nd St., New York City, has just published "Welding Procedures"—a conveniently grouped, 55-page book clarifying the proper welding process for a particular metal under various circumstances.

Strong, fast economical welds can be made only by a welder who has a complete knowledge of the factors involved in welding the particular metal he is joining. "Welding Procedures" gives the reader the full benefit of Air Reduction's long experience in oxyacetylene and electric arc welding, brazing, etc.

In addition to recommending process, the book recommends the best filler metals to be used for each process, and describes specialized welding techniques not commonly known. In an appendix, data is given for the calculation of electrode and gas welding rod consumption for different types of welds; also comparative welding record sheets for tabulating data that will determine the best welding method for a particular job.

Metals are grouped alphabetically under such headings as Aluminum, Die Cast Metals, Malleable Iron, Steel, Wrought Iron, etc. For each analysis of each metal, (such as high carbon steels, medium carbon steels, low carbon steels) recommendation of process, of filler rod, and special technique are given.

The book will awaken welders to the fact that where a choice exists between two or more processes the operator is prone to use the process in which he is most adept, without stopping to consider the ultimate cost. By use of the cost data sheets in the book and by gaining a keener appreciation of the fields for which gas or arc welding are particularly fitted, the operator will be able to produce better welds at less cost.

FOR YOUR CONVENIENCE

American Artisan, 6 N. Michigan Ave.
Chicago, Ill.

Please ask the manufacturer to send me more information about the equipment mentioned under the following reference numbers in "New Products" and "New Literature." (Circle numbers in which you are interested):

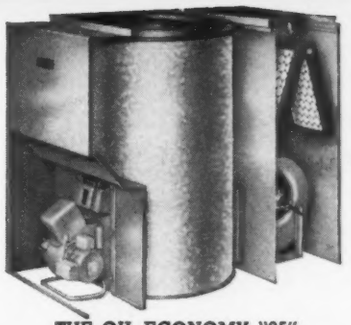
191	192	193	194	195	196	197
198	199	200	201			
226	227	228	229	230	231	232
233	234	235	236	237	238	239
240						

Name .....

Company .....

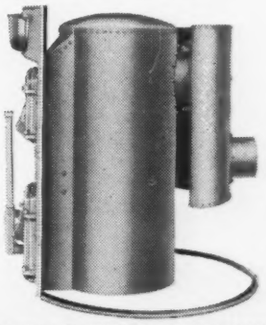
Address .....

Are you Manufacturer——Jobber——Dealer——

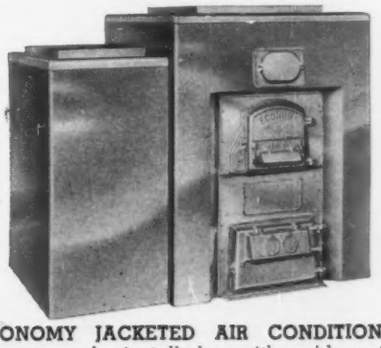


THE OIL ECONOMY "85"
The unit designed for the new type of smaller home complete with oil burner.

ECONOMY BLUE FRONT FURNACE
Available in sizes from 18" to 30" firepot—all rated by National Association.



100 SERIES ECONOMY STEEL FURNACE
Riveted and welded construction. Available in four sizes 20", 22", 24" and 27".



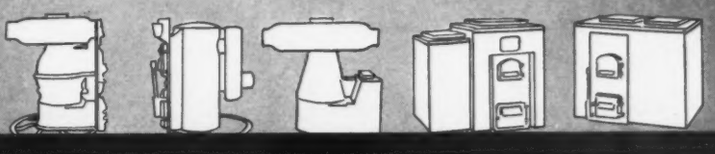
ECONOMY JACKETED AIR CONDITIONER
Blower may be installed on either side or the back—whichever is better for your installation. Built of cast iron.

A Complete Line of Heating Equipment

The International line is complete. In addition to above are units for large jobs for solid fuel and heaters of special design for oil, gas and stoker. Stocks carried with jobbers at all principal points. Write Department A-12 for further information.

INTERNATIONAL HEATER COMPANY
UTICA, N.Y., U.S.A.

WESTERN OFFICE AND WAREHOUSE • 1933 WENTWORTH AVE., CHICAGO, ILL.
NEW ENGLAND OFFICE AND WAREHOUSE • 110 CHESTNUT ST., NASHUA, N. H.
STOCKS CARRIED WITH WHOLESALERS IN ALL PRINCIPAL CITIES



Association Activities . .

Milwaukee

Oliver Gedeist of Federal Building Products Co., 1115 S. 41st Street, Milwaukee, advises that plans are now in process for a series of weekly open meetings for furnace and sheet metal dealers and their employees starting in February. These meetings will include speakers on the following subjects:

Getting Business in 'Off Seasons'
Avoiding Mechanical Difficulties in Air Conditioning Work
Getting Prospects and Closing Sales
Getting Rid of Timidity in Following Up Prospects
How to Make Money in the Heating Business

There will be an open forum at each meeting.

It is planned to dwell simply and thoroughly with various electric controls. This will be done with demonstrations of the proper combinations of controls by representatives of manufacturers. Charts will be used and copies of the charts will be made available to those attending. Wiring of the various units will, of course, have substantial emphasis.

An announcement of the exact dates will be made early in January. Each meeting will have a special speaker.

◆

Wisconsin

The Board of Directors of the Sheet Metal Contractors Association of Wisconsin met on November 3 with President T. P. Brenner, Directors Krueger, March, Mantei, Stafanik, Biersach and Chairman O. A. Hoffmann present.

Communications from the U. S. Department of Labor and the New York State association were read and disposed of. The U. S. Department of Labor suggestions as to the elimination of certain materials to improve manufacturing conditions were approved.

The arrangements for speakers and subjects for the coming annual convention were reported. The badge was approved, and the registration fee of $2.50 for the men and $1.50 for ladies fixed to cover all entertainments and the banquet and dance. Miss Elise Goethel has again been engaged for cashier at the allowance of $10 for her service. The secretary reported that he would attempt to release the year books early in January, to be followed by a reminder blotter of our convention.

Paul L. Biersach, Secretary.

1942 CONVENTIONS

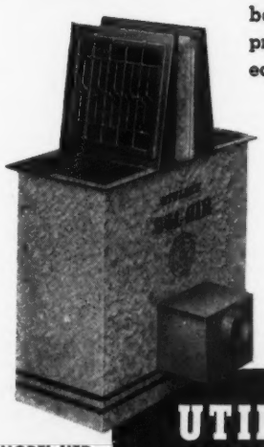
Jan. 12-15—Refrigeration Equipment Manufacturers Association. Exposition. Stevens Hotel, Chicago.
Jan. 26-28—National Warm Air Heating & Air Conditioning Association. Annual. Benjamin Franklin Hotel, Philadelphia.
Jan. 26-30—International Heating and Ventilating Exposition. Seventh Annual. Commercial Museum, Philadelphia.
Jan. 26-30—American Society of Heating & Ventilating Engineers, Annual. Bellevue-Stratford Hotel. Philadelphia. A. V. Hutchinson, Secy., 51 Madison Ave., New York City.
Feb. 2-4—United Roofing Contractors Assn. Annual. Hotel Pennsylvania, New York City.
Feb. 4-5—Indiana Sheet Metal & Warm Air Heating Contractors. Annual. Indianapolis.
Feb. 9-11—Sheet Metal Contractors Association of Wisconsin, Inc. Annual. Hotel Schroeder. Milwaukee.

These new Shears cut straight to within a few thousandths of an inch. High production results from their speed of 75 strokes per minute, instant acting sleeve clutch and convenient operation.

Drive is enclosed in oil tight case. Motor is direct connected. Standard equipment includes ball-bearing, self-measuring, parallel back gage, front and side gages, and four edge, solid tool steel knives. Niagara Machine & Tool Works, Buffalo, N. Y., Branches: New York, Cleveland, Detroit.

Depend on UTILITY

For heating equipment that has been tested in the laboratory and proven in actual operation—heating equipment that is efficient, economical and dependable.



MODEL HFD
DUAL REGISTER FURNACE

From all departments of the huge Utility plant, completed parts move steadily to the modern assembly lines, where Utility Heating Equipment is assembled, inspected and tested by capable, experienced workmen.

MANUFACTURERS OF FORCED-AIR BASEMENT AND CLOSET FURNACES, FLOOR AND DUAL REGISTER FURNACES, CIRCULATING HEATERS AND UNIT HEATERS

UTILITY FAN CORPORATION

4851 SO. ALAMEDA STREET • LOS ANGELES, CALIFORNIA

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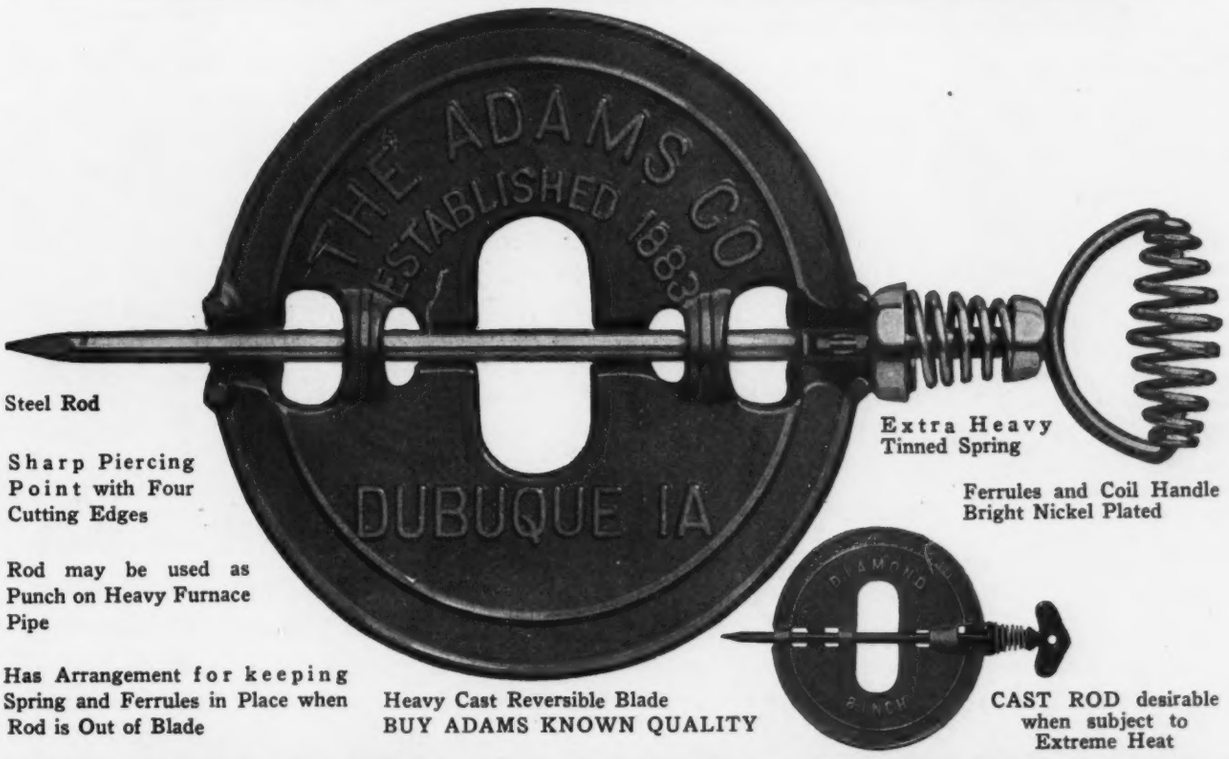


Steel Rod

Sharp Piercing Point with Four Cutting Edges

Rod may be used as Punch on Heavy Furnace Pipe

Has Arrangement for keeping Spring and Ferrules in Place when Rod is Out of Blade

Heavy Cast Reversible Blade
BUY ADAMS KNOWN QUALITY

Extra Heavy Tinned Spring

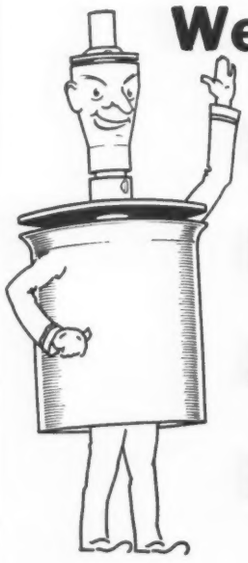
Ferrules and Coil Handle Bright Nickel Plated

CAST ROD desirable when subject to Extreme Heat

DIAMOND SMOKE PIPE DAMPER

Manufactured by THE ADAMS COMPANY Dubuque, Iowa, U.S.A.

ESTABLISHED 1883



We don't say that everybody buys JOHN ZINK BURNERS

— but we do say that every time a major construction program is under way John Zink Burners are seriously considered.

Wherever gas or oil is used for fuel— John Zink makes a better burner for you to use.

SERIES "V" BURNER
Pre-Mix Type

SERIES "R" BURNER
Refractory Type

SERIES "S" BURNER
Popular Zink Star Type

CONVERSION
FURNACE BURNERS
Luminous Flame Type

FLOOR FURNACES — UNIT HEATERS

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Chicago, Ill.—7309 E. End
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Houston, Texas—5634 Lawndale

Association Activities . . .

Master—Chicago

The Master Furnace & Sheet Metal Association met at 7435 South Cottage Grove Avenue on December 1, and the following officers were elected:

President—Floyd Townsend
Vice President—Elmer Drodeen
Treasurer—John Serson
Secretary—A. L Nelson

Lou Reining of Cook Electric Company talked on different methods of control for warm air coal-fired systems.

Door prizes were given for attendance, appearance, etc. A set of controls was donated by Lou Reining, and dog nut crackers by Northwestern Stove Repair. Beer and sandwiches followed the meeting.

A. L. Nelson, Secretary.

◆

Eleventh Forced Warm Air Conference

The Eleventh Annual Forced Warm Air Conference will be held March 23 to 26, inclusive, at Michigan State College, East Lansing. This conference is jointly sponsored by the Mechanical Engineering Department of the college and the National Warm Air Heating and Air Conditioning Association and specializes in the design of forced warm air heating systems. Three classes are accommodated, namely: design of a small system, for beginners; design of a large zoned system, for advanced students; and the design of a system converted from gravity to forced air.

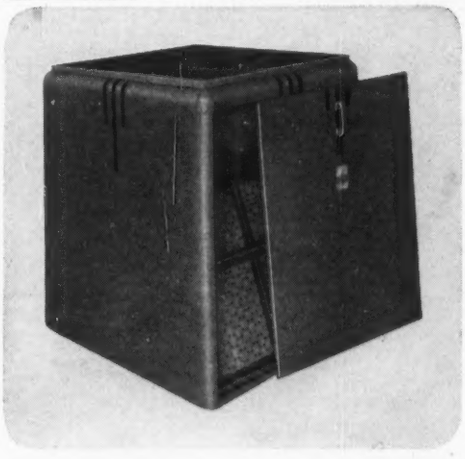
Professor Kratz will be in attendance for lecture and consultation.

Further information may be obtained from Professor Lorin G. Miller, Mechanical Engineering Department, Michigan State College.

◆

Associated—Chicago

The Associated Air Conditioning & Sheet Metal Contractors met at their hall—11145 South Michigan Avenue —on November 26. President H. M. Daily made some in-



Viking Blower-Filter Unit
Converts any Gravity Furnace Into a Modern Forced Air System

Every owner of a gravity furnace would like a modern forced air unit, but not all need or will buy a new furnace. You can provide them with all the advantages of evenly distributed, filtered, circulating warm air by installing a Viking Blower-Filter Package on their present furnace.

Write for complete specifications, prices and sales helps.

VIKING AIR CONDITIONING CORP.
5600 Walworth Ave. Cleveland, Ohio

teresting remarks about association work, and called on Louis Reining to tell about priorities and the effect on the manufacture of humidifiers, particularly thermo-drip.

Howard Mason of Chicago Furnace Supply Company, the guest speaker of the evening, talked at length on manufacturer-jobber-dealer co-operation and simplifying their orders, thus helping get orders out much faster. He very ably illustrated how we could save time and confusion. He also spoke of the probability of furnaces and perhaps materials being prorated next year. He suggested that it may save many a headache if when we submit bids, they be accompanied by the statement that all prices quoted are subject to our ability to obtain materials and labor. Another safeguard might read "Bids must be accepted within ten days."

A turkey raffle has been set for December 17 at the association hall—11145 South Michigan Avenue. Everyone is invited. The Turkey Committee appointed is: Howard Mason, Chairman, William Gierman, and John Van Der Steeg.

A. R. Harris, Secretary.

◆

Milwaukee

The Milwaukee Sheet Metal Contractors Association met in the Bamboo Room of the Medford Hotel on December 1st—called to order by President Angelo Hoffmann.

Chairman Hoffmann related the activities of the apprenticeship committee, stating that they had inducted approximately fifty apprentices in the industry.

Following the election of a new Board of Directors, these newly elected directors met and elected the following officers:

President: Walter Marth.
Vice President: Joseph Geier.
Secretary: R. V. Mundkler.
Treasurer: Frank Kramer.
Secretary Executive: Paul L. Biersach
Sergeant-at-Arms: Louis Stefanik.

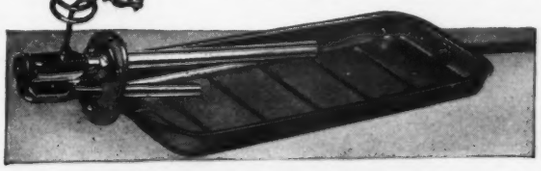
Paul L. Biersach, Secretary.

Choose your humidifier for *MEASURED* moisture and you'll choose

THERMO-DRIP

● It automatically accelerates, throttles or shuts off the water feed as the temperature in the furnace rises or drops . . . never a fixed amount of water in the pan regardless of whether the furnace is hot or cold . . . never the uncertainty about the amount of vaporization. For, the pan will vaporize only the parade of water drops fed in direct proportion to temperature. That's *measured* moisture!! That's performance that satisfies!

Ask Your Wholesaler or Write Us for Complete Details



AUTOMATIC HUMIDIFIER CO.
18th and Main Street CEDAR FALLS, IOWA

FOR NATIONAL DEFENSE
Automatic Gas Heating Promotes Economy and Health

★ Fuel conservation and National health are important parts of today's all-out defense program. You, as a dealer for PACIFIC gas heating appliances, can promote both—PROFITABLY.

★ Proper housing of defense workers demands both new installations and replacements in the rehabilitation of existing homes.

★ The PACIFIC extra value line is ideally suited for today's special defense requirements. Fully automatic control assures uniform, healthful warmth while it conserves fuel consumption. Completely assembled units save time and labor in installation and quick, easy access to all operating parts minimizes service.

★ There is no economical substitute for experience and quality. Check PACIFIC'S advantages for today's big defense housing market. Ask about the liberal PACIFIC dealer set-up.

Pacific
GAS RADIATOR CO.
HUNTINGTON PARK, CALIFORNIA

NORCO PRODUCTS

..First Line for Home Defense!

Are you doing your part in the big government drive to repair home heating plants? A big national advertising campaign is carrying the message "Repair for Home Protection" to every home owner in the country. Join this effort now. Norco repair parts for heating plants will make it possible for you to make big profits in repair jobs. Start calling on homes at once. Order your repair parts needs from Norco. We can fill your order promptly.

NORTHWESTERN STOVE REPAIR CO.

MANUFACTURERS OF STOVE, FURNACE & BOILER REPAIRS

662 WEST ROOSEVELT ROAD • CHICAGO

With the Manufacturers . . .

Ruby Chemical Increases Capacity

To meet increased demand by the government, and by industrial concerns working on defense orders, the Ruby Chemical Company, 56-78 McDowell Street, Columbus, Ohio, has purchased additional equipment. New glass-lined chemical vats have been installed, increasing plant capacity 100 per cent.

For thirty-four years the company has manufactured liquid and paste soldering flux for the electrical, plumbing, and metal-working trades. With the recent defense program calling for more and more work in metals—tin, copper, brass, iron, steel, etc.—many new users have come into existence calling for a much greater quantity of soldering materials.

Each of the new tanks is glass-lined making it possible to produce a pure compound. Each has a large capacity, which has brought the plant's total output up to double its former volume. Labor has also been increased.

Rubyfluid products are being produced twenty-four hours a day, Saturdays, Sundays, and holidays included. Continuous flow of soldering flux is necessary to provide the defense industries with the quantities required.

◆

Personal Appointments

William R. Groves—appointed a district manager for **Airtemp Division, Chrysler Corporation,** with headquarters in Atlanta, Georgia. Mr. Groves was recently with Westinghouse in the merchandising division.

Carl W. Millsom, Jr.—appointed to the post of **Airtemp** district manager for Western New York state, with headquarters in Jamestown, N. Y. Mr. Millsom takes over the duties of **William Dennison,** who has been advanced to the position of Regional Manager of Texas.

Come and Get 'Em

LIFETIME Warm Air Furnace

Anticipating a possible shortage of materials, we have built up an inventory of Warm Air Furnaces. If you need furnaces now or will need them later, get in touch with us at once.

A Complete Line

We offer a full line of modern Warm Air Furnaces including the 900 Series, which is a truly competitive line. Made by one of the largest and oldest manufacturers with a yearly capacity of 25,000 furnaces, the name Royal stands for quality.

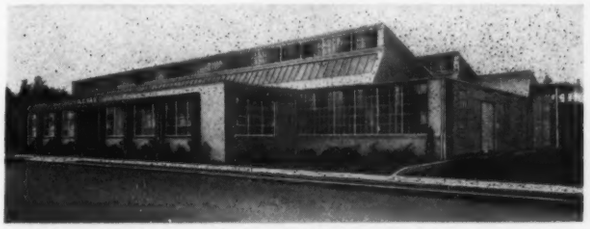
HART & CROUSE

CORPORATION

301 TURNER STREET UTICA, NEW YORK

Acme Builds New Factory

The Acme Electric Welder Co., 2618 Fruitland Rd., Los Angeles, has completed a new modern factory covering an area of 18,000 square feet. The main bay is 180 feet wide and is constructed of steel and brick, and to provide the maximum of light. There is a complete absence of overhead shafting so that every machine in the building is daylight illuminated. The interior is painted with a luminous white, for proper reflection of light.



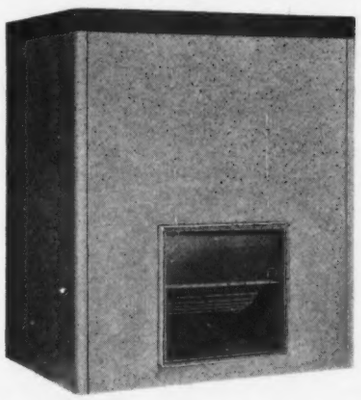
New machinery has been installed to permit straight line production of electric spot welders. The line consists of 35 models, ranging from 10 to 1000 KVA. New equipment includes power operated metal shears, lathes, grinders, hoists and material handling equipment, enclosed spray booths, rotating parts, bins and special steel racks.

The offices are illuminated with Fluorescent lighting.

With the completion of the new factory, production is more than doubled, and the firm is engaged in the execution of a number of defense orders in addition to orders from standard customers.

Acme Electric Welder Co. was established approximately twenty-six years ago and for a great many years has been under the direction of William M. Levyn, assisted by his sons, Stanley M. and Robert J. Levyn. The company is engaged in the manufacture of the Acme "Hot Spot" welders and other standard and special resistance welding equipment.

SOLVE THAT "HARD-TO-HEAT" PROBLEM WITH REX AIR-PAK BLOWER FILTER UNITS!



Write now for our new catalog Bulletin No. 238 containing the latest data on REX AIR-PAKS.

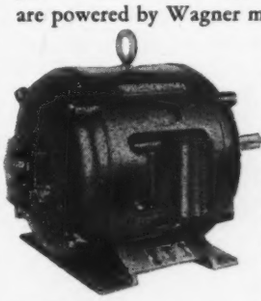
Air CONTROLS INC.

Division of the Cleveland Heater Co.

2311 Superior Ave., N. E. CLEVELAND, OHIO

Reliable WAGNER Motors for DEFENSE INDUSTRIES, ARMY CANTONMENTS, NAVAL STATIONS, SHIPS, etc CAN BE SUPPLIED Promptly!

OUR country has sounded the call for equipment and machinery for national defense. Equipment manufacturers everywhere are answering that call—heating, ventilating and air-conditioning equipment manufacturers are no exception. Already thousands of heating, ventilating and air-conditioning units are doing their part in the defense program—a large percentage of these units are powered by Wagner motors, and for good reasons, too:



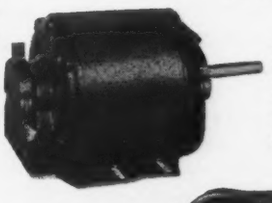
1. Established reputation for building efficient, dependable motors.
2. Complete line—the right motor for every type of equipment, and all service conditions.
3. Quick shipments to handle rush defense orders.
4. Ample plant capacity to handle any order, large or small.
5. Fifty years of manufacturing experience.
6. Convenient service facilities through 25 branches.

Six good reasons why you should look to Wagner for motors for all your defense production.

SEND FOR THESE BULLETINS

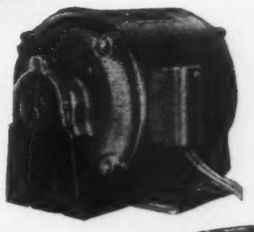
Free copies of Bulletins MU-182 and MU-183 will be sent upon request.

Type RP, Squirrel-Cage (1/6 to 400-hp) — because of a simple construction are low-priced, easily installed, and exceptionally sturdy and dependable.



Type M, Shaded-Pole Fan Motors (1/125 to 1/30 hp)—ideally suited for fan and blower drives where the fans or blowers are mounted directly on the motor shaft.

Type RA, Repulsion-Start-Induction (1/8 to 15-hp)—the ideal motor for heavy duty applications.



Type RK, Capacitor-Start Induction-Run (⅛ to ¾-hp).

WAGNER ELECTRIC CORPORATION 50TH 1891 • 1941 ANNIVERSARY ST. LOUIS, MO

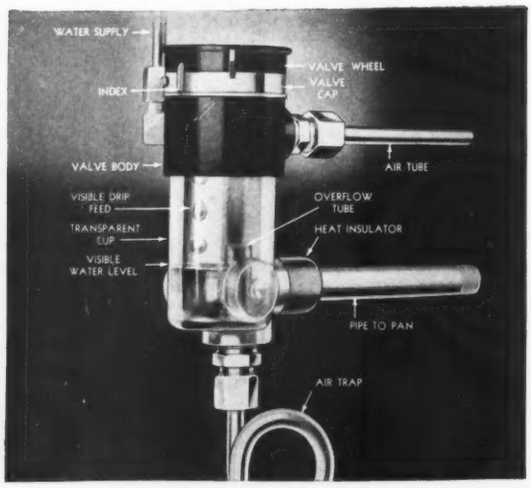
This year Wagner celebrates its fiftieth year of service to industry and the home—as a manufacturer of motors, transformers, and fans of the highest quality.

M41-29

Wagner Electric Corporation

6400 Plymouth Avenue, Saint Louis, Mo., U.S.A.

MOTORS • TRANSFORMERS • FANS • BRAKES



MONMOUTH MICRO-FEED CONTROL

Perfected by years of experience, this humidity control valve has many important exclusive advantages:

CORRECT CONTROL PRINCIPLE — By constant feed rate it gives constant increase of humidity over normal air dryness. This results in the automatic maintenance of lower humidity as the temperature of weather, windows and walls becomes lower, eliminating unwanted condensation. This is ideal.

VISIBLE WATER LEVEL—A glance at the transparent plastic cup readily shows how high the water is in the pan.

VISIBLE DRIP FEED—The owner plainly sees how fast water is being supplied and evaporated.

LIME PROOF—The sealed-in drip feed makes lime deposits and clogging impossible.

CORROSION PROOF—High-grade plastic housing and metal alloys cannot corrode.

TROUBLE FREE—So simple in structure and so well engineered that nothing can go wrong that requires free servicing.

PRICE ONLY $6.65—Net to dealers, f.o.b. Cleveland, for complete humidifier, including pipe clamp valve, 17 ft. of tubing, 20" pan with supports and Micro-feed valve. Plate rack and vapor diffusing plates extra according to increased capacity desired.

WRITE TODAY—for complete details. Get started on the humidifier you have long been looking for.

MONMOUTH PRODUCTS CO.

1933 E. 61st St. Cleveland, Ohio

MONMOUTH

The Greatest Name in Humidification

With The Manufacturers . .

W. L. McGrath, executive vice president of **The Williamson Heater Company,** Cincinnati, has been appointed by the Office of Production Management to the Plumbing and Heating Defense Industry Advisory Committee — a 19-member committee which will speak for this industry in discussions of mutual problems between industry and the OPM as the result of the National Defense effort.

◆

Fred Surridge

Fred Surridge, manager of the St. Louis office of Grant Wilson, Inc., passed away on November 2, after a rather long illness. He had been confined to St. Luke's Hospital for the last three months and had undergone several operations. Mr. Surridge was an outstanding character in the asbestos business in the Southwest area, having been identified with the industry for some thirty years, the last eight with Grant Wilson, Inc. Mr. Surridge is survived by his wife and daughter.

50 YEARS OF LEADERSHIP

The Time-Tested

ATH-A-NOR

Furnaces, like any other piece of merchandise, are only as good as the people who make them. The May-Fiebeger Company has been making the ATH-A-NOR Furnace illustrated for over fifty years, and the fact that it will perform with unusual efficiency and economy is backed up by hundreds of satisfactory installations.

If you've been looking for a fast-moving, top performing gravity furnace to round out your line, investigate the ATH-A-NOR now! A postcard request will bring literature.

- **QUALITY**
- **ECONOMY**
- **EFFICIENCY**

. . . write today for further information!

MANUFACTURERS OF QUALITY HEATING EQUIPMENT FOR OVER 50 YEARS

MAY-FIEBEGER COMPANY

NEWARK OHIO

C. O. Menig, vice president of **Pacific Gas Radiator Company**, Huntington Park, California, manufacturers of gas-fired heating equipment, has been appointed to serve on a special advisory panel by Leon Henderson, Administrator of the Office of Price Administration and Civilian Supply.

The advisory panel is made up of executives selected from the domestic cooking and heating appliance industry. Its purpose is to attend meetings in Washington and to supply qualified advice on problems relating to price. The panel is organized to form an expert group from which special committees may be selected as the occasion requires.

◆

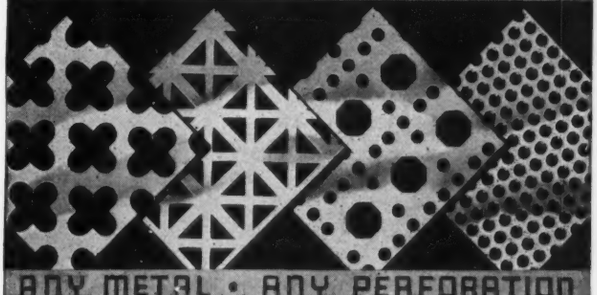
Sweatt Member OPM Committee

H. W. Sweatt, President of **Minneapolis-Honeywell Regulator Company**, was named a member of the Plumbing and Heating Industry Defense Advisory Committee of O.P.M., it has been announced by O.P.M. in Washington.

George J. Haislmaier—appointed sales manager of the Contract Products Division of **Young Radiator Company** at Racine, Wisconsin. Mr. Haislmaier has been with the Young Radiator Company since 1936, serving as assistant sales manager and government specification engineer.

J. J. Hilt, who has been serving as Contact Division Sales Manager, in addition to his duties as Vice-President, will now devote all his time to the further development and co-ordination of the rapidly increasing volume of contract work being handled by the company for military and defense needs.

PERFORATED METALS
Industrial and Ornamental



Industrial Perforations include all sizes of round, oblong, and many special shaped perforations, for Screening, Grading, Draining and Guarding purposes. Our line is very complete.

Ornamental Perforations are used in Architectural Grilles, Radiator Enclosures, Metal Furniture, Cabinets, Stoves, etc. In addition to the standard shapes we have many exclusive and attractive designs suitable for different uses.

H&K workmanship is unsurpassed.

Write for prices and other information.

The Harrington & King PERFORATING Co.

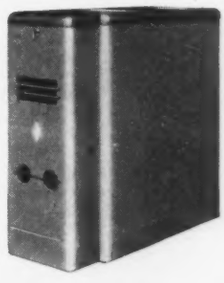
5649 Fillmore St., Chicago, Ill. New York Office, 114 Liberty St.

WHY I'M GLAD I SELL PAYNEHEAT

EVERY *Payne* UNIT I INSTALL HELPS SELL ANOTHER!

"PAYNEHEAT MAKES WARM FRIENDS, say the ads. And that's certainly true in my community," writes a PAYNE Dealer. "Every time I install PAYNE Gas Heat, I have another 'Open Sesame' to new prospects, sales, profits." ☆ Throughout the Nation, PAYNE Dealers and Gas Companies enjoy real *cash value* in the goodwill which PAYNE Quality creates. With a quarter-century of experience in Gas Heat, PAYNE today offers 69 styles and sizes of heating equipment . . . one for every heating need. ☆ Recommend and sell reliable PAYNEHEAT – prove for yourself that "every sale builds another sale!"

In the Emergency, our order of delivery is as follows: (1) U. S. Defense needs; (2) Established Payne Dealers' orders; (3) New business. For further information we cordially invite you to write J. H. Keber, Sales Manager.



PAYNE Zoneair Unit. One of the versatile 69 models and sizes produced by PAYNE. All are double-tested: AGA plus PAYNE Testing Laboratory.

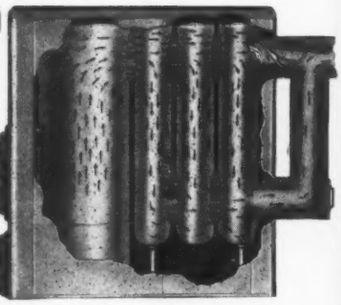
PAYNEHEAT
MORE THAN A QUARTER-CENTURY OF GAS SPECIALIZATION
Payne Furnace & Supply Co., Inc., Beverly Hills, California

STACK TEMPERATURE Down-SALES GO UP

This patented Automatic Damper is the greatest sales feature in America's most active heating market — the warm air field. And only Leader dealers have this advantage.

HOT GASES TRAPPED

See how simply the KOOLSTACK principle works. Action of the Patented Automatic Damper prevents hot gases escaping up the chimney. Instead they are diverted through the economizer sections until every possible heat unit has been surrendered. An exclusive saving, selling advantage.



SELL ALL *THREE*

HAND FIRED STOKERS OIL BURNERS

THE Leader dealer meets the needs of EVERY customer, EVERY market. Because KOOLSTACK furnaces operate economically, satisfactorily, whether hand-fired, stoker fired or oil-fired. Yes sir! There's real profit, real opportunity when you can sell ALL three. And that's exactly what the Leader dealer can do. Don't put off writing another minute. Get the money-making facts about your Leader opportunity now.

Leader KOOLSTACK furnaces available in BOTH cabinet and round-cased types. Gravity or forced air circulation optional. All welded construction. Capacities 50,000 to 200,000 B. T. U.'s.

LEADER IRON WORKS, INC.
DECATUR ILLINOIS
2841 NORTH JASPER ST.

Rehabilitation Program

(*Continued from page* 34)

the tracks," even in the days before the War emergency, calculates that expenditures for heating plants, ducts and other equipment, average 12.4% of the total spent in improvements. Curiously enough, in earlier experiences of the FHA, heating improvements in $202,000,000 worth of loans insured totalled roughly $26,000,000, which is equivalent to 12.4% of the whole. Other agencies which have had rehabilitation work on old houses have reported expenditures as high as 20% of the total disbursed.

320 Millions of Work Waiting

It has been estimated there is now awaiting rehabilitation in Defense areas a total of not less than $320,000,000 worth of work. The figure is rough, and is largely based on Government studies of various reports, including Census digests. It has been used by the Government agencies as an indication of the total of money that might be spent upon rehabilitation if the industrial groups and firms really get after the business in an organized manner. The Government agencies obviously will put all the weight of their influence behind such drives and will give every assistance within the law. There are undoubtedly many means of advertising which would be encouraged by the housing agencies and by the defense agencies.

Housing is one of the chief headaches of defense work. To really get the picture it is essential to understand the fact that at least three-fourths of the construction for direct defense needs has yet to be

BUY WHITNEY-JENSEN
METAL-WORKING MACHINERY and HAND TOOLS
for LONG LIFE and ACCURACY

TOGGLE-ACTION
FOOT PRESSES
7" 10" 18" 24" THROAT DEPTHS

Simple, sturdy construction, light weight with plenty of strength, lasting accuracy, low cost, and availability for prompt shipment—these features make Whitney-Jensen Foot Presses a stand-out value for light punching and forming operations. Capacity 2" hole in 16 ga. iron, 100 holes per minute or better.

Write for Catalog 14

IMPROVED
No. 17 BENCH PUNCH

New features: Throat depth now 6½" height of throat 1⅛". Jaws are welded steel plate. Weight reduced 30%. New depth and side gauges. Capacity ¼" hole in ¼" iron. A popular punch.

OVER 80 USEFUL ITEMS FOR SHEET METAL SHOPS

WHITNEY METAL TOOL COMPANY
91 FORBES STREET • ROCKFORD, ILLINOIS

done. A bill recently was enacted by Congress providing another $7,000,000,000 for the Army. The appropriation contains an item ranging somewhere between $1,600,000,000 and $2,000,000,000 to be expended for direct defense construction. The general understanding here is that by the early part of next year another war budget of $38,000,000,000 will be provided by the Congress.

All this obviously includes construction of plants, ordnance depots, airfields, shipyards and similar protective and defense industrial projects, mainly involving heavy construction. The latest report shows that currently scheduled industrial construction runs about $2,250,000,000; in January it is expected to run about $2,750,000,000; next July, OPM expects it will total $4,000,000,000; and for January 1943, the total is estimated at $5,000,000,000. Direct military construction is expected to total in excess of $6,500,000,000 by July; over $8,000,000,000 by 1943. With increased budgets these figures are bound to be revised upwards.

Defense Building Hardly Started

The TOTAL defense construction in July, 1941 was less than $6,000,000,000; by January 1942 it will total $9,000,000,000; by next July it is expected to reach $12,000,000,000; and for 1943 this over-all defense construction is calculated at $15,000,000,000.

It is obvious this means a stupendous volume of shelter for defense workers must rapidly come into existence; and it clearly spells that rehabilitation will be welcomed by Government as one of the swiftest and most consistently available methods of furnishing shelter quickly. It cannot be brought home too quickly to those interested that any effort to sell the idea of rehabilitation to those who control the large old

For Profitable Service Calls . . . Use the FREE

RESEARCH AIR FILTER Service Selling Kit!

Write for Details Today!

RESEARCH PRODUCTS CORP.
Madison - Wis.

Mercoid Offers a More Compact Design in Limit and Fan Controls with the Addition of an Outside Adjustment Feature

The new Limit Control designed to protect the furnace from overheating is known as Type M-41 and the Fan or Blower Control as Type M-43. The Fan Control prevents blowing cold air into the rooms if the furnace is not hot enough to deliver heat.

Both of these instruments operate on the same principle as the previous models. All of the desirable features have been retained and new ones added.

Simple Outside Adjustment

A new feature is the outside adjustment located in the center, on front of the instrument. This adjustment facilitates the setting of the operating range. Instruments are furnished standard at 70-310 degrees. The range can be adjusted over the entire scale and the differential can be set for very close operation or widened to meet various field conditions.

An adjustable flange is provided which permits mounting instruments on furnace hoods at any angle between 30 to 90 degrees.

The electrical capacity rating is 10 amp. 115 volts, or 5 amp. 230 volts.

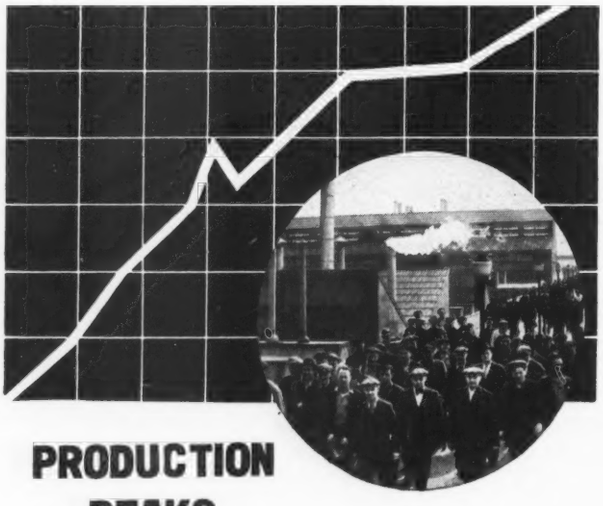
Mercoid Switch

Like all other Mercoid Controls, these instruments are equipped with hermetically sealed mercury switches, trade marked "Mercoid." They are immune to all forms of corrosion—a common cause of trouble.

These controls are offered to the trade with the usual Mercoid assurance of complete satisfaction.

Further information may be had by writing for Bulletin D-4.

THE MERCOID CORPORATION • 4207 BELMONT AVE. • CHICAGO



PRODUCTION PEAKS

Demand Efficient Workers

War-conditioning to keep our Country great, free, powerful and happy demands production peaks of every useful industry. Where employees can labor comfortably and healthfully, they work at top efficiency and achieve production peaks. Only with modern methods of heating, ventilating and air-conditioning will employees' efficiency and morale best meet the strains of the day.

How well are you personally equipped to judge what is needed to guard your interests by conserving man-power?

There is no better way to fit yourself to act wisely and promptly on these pressing problems than to visit the 7th International Heating and Ventilating Exposition —the Air-Conditioning Exposition at Philadelphia in January.

Be sure to visit this outstanding biennial event so you can act with greater assurance and confidence. You owe that to your business, your associates, your Country and yourself.

7th INTERNATIONAL HEATING & VENTILATING EXPOSITION

The Air Conditioning Exposition

COMMERCIAL MUSEUM • PHILADELPHIA • JANUARY 26-30, 1942

Under the Auspices of American Society of Heating and Ventilating Engineers

MANAGED BY INTERNATIONAL EXPOSITION COMPANY

776-B

houses, often "across the tracks," will have the utmost support and active assistance from Government authorities.

Your potential client can get technical assistance in planning changes for nothing. Government is ready to furnish the skill of experts to make studies, plans, and even to take a hand at directing installations and changes, if this help is wanted. The information about all this service may be obtained from the nearest Federal Housing Administration office. These offices are now plentifully scattered all over the United States. FHA officials act as the intermediaries for the Office of the Defense Housing Coordinator. As his agents the FHA people in your neighborhood will start the process by which your client can get the materials with a high preference priority rating to make the alterations as quickly as possible. They will guide your client and they will guide you in making out the appropriate forms and they will show you what to do to make them move swiftly. If there is a hitch anywhere along the line, communicate with the Defense Housing Coordinator in Washington. He has an organization that is well-coordinated and on its toes.

Bear in mind, also, that at the HOLC rate of 12.4% of expenditures for heating plants and equipment, the potentialities suggested by Government in Defense areas mean that in 254 communities, and in 37 to 39 States, as well as in Territories and in the District of Columbia, millions of persons may spend $40,000,000 for heating installations. Moreover, at the FHA rate of 15.6%, the expenditure will be approximately $50,000,000. And mark that this form of expenditure is popular with this Government group because it throws considerable business into the orbit of those metal business units that theoretically at least are suffering

YOUR **BLOWER** REQUIREMENTS

available at

Schwitzer-Cummins Company

● BLOWERS FOR EVERY PURPOSE

HY-DUTY Blowers, 9 ¾" to 25".
Top and Bottom Horizontal, and Top and Bottom Vertical Discharge.
Top and Bottom Motor Mounting.
Dual Units also available.

● CENTER DISC WHEEL

Double Inlet, Double Width.
Reinforced Center Disc.
Designed for Modern Air Conditioning and Heating Applications.
Sizes, 4 ½" to 50".

● SINGLE INLET WHEELS

For Oil Burner, Stoker, and Air Conditioning Applications.
Sizes, 4 ½" to 50".
Variety of Blade Lengths for each diameter.

● ENGINEERING DATA

Write for Catalogues showing complete Performance Data.
Experienced Engineering Department available to help solve your Air Handling Problems.

BLOWER DIVISION
SCHWITZER-CUMMINS COMPANY
125 FAN STREET INDIANAPOLIS, U. S. A.

as the result of the curtailments that have followed the Priorities and Allocations.

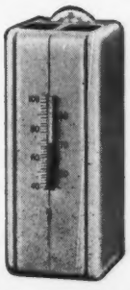
These expenditures will be widely scattered and thoroughly broken down. Also, they go into the areas of the country where there has been much concern over the effect of the scarcities . All these things will give much comfort to the defense authorities in OPM, OEM, OPA, SPAB, and elsewhere. The uproar raised in Congress, at the White House, and elsewhere in the Capital, by the small business men who have been hard hit by scarcities, either actual or potential, has worried the men who make the war machine move. They will welcome any opportunity to relax the restrictions they have placed on raw materials, or on fabricated materials, like those required in heating plants and in the equipment used to install complete heating systems. It gives then an out, in connection with the pressure that is growing intolerable. If the restrictions are not abated by some such means as this program to secure wholesale rehabilitation in defense areas, January is expected to be terribly trying for those responsible for the restrictions. In January the pressure of the restrictions is expected to become more drastically apparent and perceptible.

It is probable more precise information in regard to rehabilitation needs in specific localities will be available. The Defense Housing Coordinator's Office is said to have more specific data about 15,000 jobs that are ready in various communities. It is possible the details may be available in the local Federal Housing Administration offices. Some order is gradually coming out of the chaos and it is out of this work that contractors will gradually get the help needed from Government sources to really make headway.

No minimum construction standards have been set up in connection with these rehabilitation jobs, so far

RUGGED CONSTRUCTION
SIMPLE OPERATION

Those are the features that assure the trouble-free operation and long life of this regulator. For you, this means freedom from service calls and a friendly feeling on the part of your customers . . . when you install the



MASTER
HEAT REGULATOR TYPE P-23

Available for Immediate Delivery

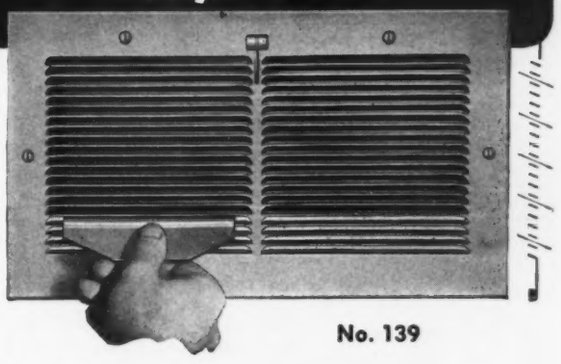
This positive, snap action regulator operates on a differential of only ½ degree. Accurate, dependable, low cost, it will outlast the heating plant itself. Operates quietly, surely, and safely — to the complete satisfaction of the most exacting user. Write us today for bulletin giving complete information on the Master line.

WHITE MFG. CO.

Makers of Dependable Regulators for 25 Years

2368 University Ave. **ST. PAUL, MINN.**

INDEPENDENT
WROUGHT STEEL
Air Conditioning Registers



No. 139

Flexible Grille Bars Make Adjusting Easy

Always Leading . Always Progressing

This modern Independent register has attained great popularity because it presents fine appearance and high efficiency at moderate cost. The grille bars are formed of sheet metal and come regularly adjusted to direct air flow slightly downward. Being flexible, they can be bent to direct air flow to any other desired angle, upward, downward or straight outward. Materials and workmanship are of first quality. Valve is positive, free working and stays firmly in position.

Write for Catalog 41-AC

THE INDEPENDENT REGISTER CO.
3747 EAST 93rd STREET
CLEVELAND, OHIO

A SUBSTITUTE FOR COPPER

CHENEY PITCH-ON-METAL, a brand new development, has a ferrous metal core completely enclosed within a heavy baked-on coating of coal tar pitch enamel. CHENEY PITCH-ON-METAL has the strength of steel and the flexibility of copper. It is not affected by moisture, lime, or cement mortar and is resistant to most acid conditions.

Our experiments carried on with the government departments at Washington and with the Bureau of Standards definitely convinces us that our new product, CHENEY PITCH-ON-METAL, will prove a worthy substitute during the emergency.

CHENEY BLACK FLASHING is a new product identical in shape and form with the original Cheney Copper Flashing except that it is made of CHENEY PITCH-ON-METAL instead of copper.

CHENEY BLACK REGLET is made of CHENEY PITCH-ON-METAL and costs of both Black Flashing and Black Reglet are much less than copper.

CHENEY PITCH-ON-METAL SHEETS made in 24 x 96, 30 x 96, and 36 x 96 only, for use as counterflashing, downspouts, gravel stops, valleys, termite shields, ducts, etc.

CHENEY PITCH PAINT is necessary as a field coat after shop fabrication of CHENEY PITCH-ON-METAL SHEETS to seal any damage to the PITCH-ON coating.

CHENEY PITCH-ON-METAL can be satisfactorily painted any desirable color provided one coat of orange shellac is applied after all fabrication is completed.

We are now in production and as soon as possible complete stocks will be available at warehouses of Sheet Metal Distributors throughout the United States. Get in touch with your sheet metal distributor and if he has not yet received his stock and price information communicate direct with us.

We can furnish CHENEY BLACK FLASHING, CHENEY BLACK REGLET and CHENEY PITCH-ON-METAL SHEETS for either defense or non-defense construction as no priorities are necessary.

THE CHENEY CO.
Ardmore **Pennsylvania**

as FHA or other Government agencies are concerned. They feel their responsibility is limited and that it would scarcely be cricket, under the circumstances, to impose their requirements above the standards of the local codes. The Government people also will help in working out the redtape involved in qualifying under Regulation W, the instalment buying restrictions, set up under the Federal Reserve System. The forms and the blanks that must be filled and executed to secure the exemption under Regulation W are numerous, and they often exasperate the applicant for the rehabilitation help. But the Federal Housing people, and the Defense Housing Coordinator's people do their utmost to give full assistance to make these proceedings as easy as possible. After all, if you know how to proceed, it is not difficult to secure the instalment credit exemption.

Keep in mind, also, that the repair and maintenance orders of OPM, and other orders that relax priorities in favor of special defense needs, will apply to jobs done in rehabilitation of homes and other necessary structures in defense housing areas. It may also mean something to learn that the great mail order houses are doing a large business in the defense areas in rehabilitation equipment and materials. Considerable data in possession of various agencies have been contributed by the mail order houses.

◆

New York State

The New York State Sheet Metal, Roofing & Air Conditioning Contractors' Association, Inc., has set March 17, 18 and 19 as the date for the 1942 convention, to be held at Utica.

Clarence J. Meyer, State Secretary.

COLD RUNS BANISHED!
WE'RE DONE FOR JOE— THEY PUT IN A VICTOR HEAT BOOSTER
WITH THE Furnace Man's Friend
THE VICTOR
HEAT BOOSTER
This amazingly effective device not only boosts hot air into hard-to-heat rooms, it boosts profits into the pocket of the furnace man.
The Victor Booster needs only to be set in place, plugged into any electric outlet, and out pours a rich flow of hot air—not from an overfired furnace, but from an ordinary everyday fire. Two models, floor and wall. Liberal Discounts. Write today for detailed literature and prices.
VICTOR ELECTRIC PRODUCTS, Inc.
Dept. HB-7 2950 Robertson Ave. Cincinnati, Ohio
ASK YOUR JOBBER OR WRITE DIRECT

With the Manufacturers . .

Air Controls' General Office Downtown

Air Controls, Inc., of Cleveland, Ohio, announces the location of their general offices at 2310 Superior Avenue. The factory has been consolidated with the main plant at 1933 W. 114th Street.

◆

Air Control Buys New Plant

Air Control Products, Inc., Muskegon, Michigan, manufacturers of registers, grilles and accessories, recently purchased a new plant at Coopersville, Michigan. The new plant is a combination one and two-story brick building, and has almost twice the floor space of their Muskegon Plant. The company is now remodeling the new plant, which will be put into operation by January 1st, 1942. Considerable new machinery and equipment has been purchased to be installed in the Coopersville Plant.

The main office of Air Control Products, Inc., will be located in Coopersville, Michigan, about December 15th, 1941.

◆

Viking Moves to Dayton

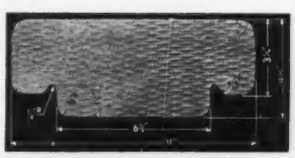
Viking Manufacturing Corporation general offices are now at Dayton, Ohio; not at Detroit, Michigan, as heretofore. This will expedite handling of orders for Viking Heating Appliances made to Viking specifications in Dayton by the Airtemp Division of the Chrysler Corporation.

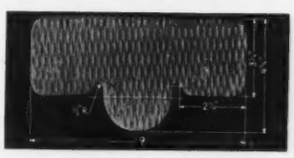
Viking merchandise for 1942 includes improved models of oil-fired water heaters and vaporizing burner furnaces, new lines of conversion oil burners, burner-furnace units, gas-fired winter air conditioners with both steel and cast iron combustion chambers, and oil-fired space heaters.

YOU CAN INCREASE THE EVAPORATING EFFICIENCY OF *OLD HUMIDIFIERS* WITH THESE *VAPOGLAS PLATES*

(Patents Pending)

● To help you solve the problem of increasing evaporating efficiency of old humidifiers Skuttle offers you these VAPOGLAS evaporating plates. They are an all-glass evaporating plate that have been widely accepted by furnace dealers as the most efficient evaporating plates on the market—and here are the reasons why they are more efficient.





1 CAPILLARY ACTION: Extremely high capillary action causes water to be quickly absorbed and rapidly carried to the farthest edge of the plate.

2 WETTER: Absorbs and holds more water per pound, with a wetter exposed surface.

3 MORE AREA: Area of VAPOGLAS per plate is greater than ordinary ceramics. Area of five VAPOGLAS plates is more than equivalent to area of a pan 7" wide by 30" long. More area and less obstruction to air stream.

4 LONGER LIFE: Inert to boiling water and temperatures to 1000° F.

FREE To convince you that VAPOGLAS will do all we claim, our distributor offers free samples for your inspection. See him today or write direct.

SKUTTLE SALES COMPANY

12308 Hamilton Avenue **Detroit, Michigan**

the

DIRECTHERM Heater

gets more heat out of your fuel

It utilizes about 80% of the invested fuel energy. No duct work, no radiator or pipes are needed. The heat is discharged directly into the room without any waste, and evenly distributed as far as 200 feet away.

To install a Directherm is almost as easy as to set up a kitchen stove; and "maintenance" is an unknown word in the Directherm dictionary.

May we give you figures and details about this economical way of heating your plant? Just write for bulletin 305-A.

AIRTHERM
MANUFACTURING COMPANY
706 S. SPRING AVE. ST. LOUIS, MO.

★ Accurate
★ Convenient
★ Complete

. . . That's the story behind the success of American Artisan's Annual Directory and Show Number to be published next January. Its completeness, accuracy and convenience have made it indispensable to dealers and contractors throughout the year for reliable reference in their buying and specifying work.

An authoritative up-to-date listing of all the products that go into residential air conditioning, warm air heating and sheet metal systems . . . names of all manufacturers who make them, trade names and addresses . . . part of regular January issue . . . bound in special, heavy, varnished cover to stand up against wear and tear of constant use . . . out early in January for service throughout the year. Write for details.

KEENEY PUBLISHING CO.
6 No. Michigan Ave. Chicago, Illinois

Heating Must Keep Pace With House Changes

(*Continued from page 29*)

houses is not harmful. Maybe no returns other than a grille in the casing will suffice. We do not know definitely, but our industry should dig up the answer.

We have seen installations where the heating man insisted on baseboard registers (at additional cost for stacking) where the partitions were all that separated the furnace closet from the other rooms. Surely we have plenty of data to insure success with high side wall registers.

There does not seem to be much chance for the radiator industry to steal this new small house market away from us, but if we, as an industry, cannot demonstrate just as much willingness to adopt our knowledge to heating as the builder has to his construction—then we can be suspected of not doing our utmost to provide good houses for small wage earners.

◆

Soldering, Brazing, Welding Instruction

(*Continued from page 61*)

by explanations, but it may be done insofar as the student will understand the process, know

"Advertising of Tripl-ife furnaces travels far"

"The Williamson Heater Company:

We received a phone call to make a free furnace inspection. We got a repack order and then sold a 'Tripl-ife' furnace without competition. When making out the contract we found, to our astonishment, the owner lived in R—, M—. Naturally, we wondered why she called us and asked her. The lady showed us two newspaper ads, one from a Boston paper, the other from a local paper. She said she had read the Boston ad, which had a testimonial from a R— customer, the day before coming to R— and brought it with her so she could call the people and find out who did their work. But this was not necessary, as she found our ad while reading The Times Union the day she arrived."

Signed—XYZ, . . . New York

Complete information; name, address of writer of above letter furnished on request. Phone, wire or write The Williamson Heater Company.

FREE: Complete, easily understood short method for figuring air conditioning job. You can complete your figures, price job in one hour flat. Write Dept. No. 2. The Williamson Heater Company, Cincinnati, Ohio.

Complete Line . . . Quick Service

WILLIAMSON
WARM AIR FURNACES

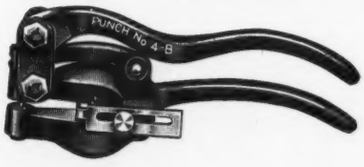
This is our Fifty-first year

how to manipulate the rod, how to adjust the machine for this or that metal, how to proceed to make a good weld. Again the stress must be put on *heating*. On contacting the metal to be welded with the electrically laden rod in a way *melting* grooves into the metal which then are filled with the melting rod, fusing the metal together. Piling the sparkling rod on the metal joint is not welding. But burning grooves into the a-butting metals while the melting rod fills the grooves, will result in a weld which may not be loosened except by the use of a cold chisel.

In arc-welding heavier gauges of metals, the grooves may be prepared by grinding. And yet, the mere *filling* of the groove with the melting rod does not prove a good weld. Rather, the prepared groove causes the rod to fuse with the wider rendered surfaces of the metals, making the weld that much more secure. In explaining the process the instructor may say that the *immediate surface* of the metal brought in contact with the sparkling rod when so contacted, will assume melting nature *first*, and the rod will fuse to this surface in proper manipulation of the rod, without penetration of the metal itself resulting in burns.

Handbooks on welding may be referred to by the instructor in this teaching. But instead of going into the maze of information contained in the book, confusing the student's mind with the

A REAL *Time Saver*



The No. 4B PUNCH

by *Whitney*

This punch is accepted by leading contractors and dealers as a real time-saver in the shop and on the job. Men who use it every day know it can't be beat for clean, fast punching. Has a capacity of ¼" through 16 ga., weight 3 pounds, 8½" in length, depth of throat, 2". Complete tool includes three punches and three dies of specified sizes with die adjusting key.

W.A. WHITNEY MFG. CO.
636 RACE ST. ROCKFORD, ILL.

But . . . This is SERIOUS BUSINESS

Yes, stoker merchants, rapid changes are taking place. *Yesterday*—easy credit, low prices, strong buying demand; *today*—restricted credit, higher prices, sluggish buyer interest, and a host of abnormal conditions that deter sales. Stoker profits will be made next year *but not without serious thinking and sound planning.*

Today, More Than Ever, Winkler's Merchandising Principles Are Fundamental to Profits.

1. Basic Business Set-Up: Is your stoker business organized on a sound merchandising basis? Do you know what *FOUR* factors in your basic business set-up are necessary for your success? If not, talk to the Winkler representative in your territory.

2. Sales Facilities: Has your stoker manufacturer helped you plan your *SALES FACILITIES* for successful merchandising? Winkler Distributors get this information and help—and they profit by it.

3. Organized Sales Processes: Modern stoker merchandising *without* organized Sales Processes is a gamble. Do you have this fundamental information? If not, talk to the Winkler representative in your territory.

4. Business Exposure: What program do you have? Winkler Distributors *Have a Business Exposure Program* that can't be duplicated because it's built on exclusive Winkler features. It means money to Winkler Distributors. Our representative will be glad to explain it to you.

Despite the heavy demands of the **National Defense Production Program** upon the U. S. Machine Corporation, Winkler Stoker Distributors are receiving, and have always received prompt shipments *on every Winkler Stoker Model.*

U. S. MACHINE CORPORATION, LEBANON, INDIANA

FULLY AUTOMATIC
WINKLER
• STOKERS •

BARD
AIR CONDITIONING UNIT

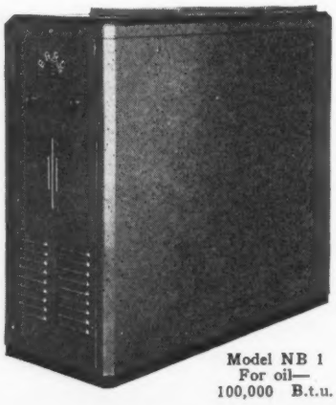
FOR OIL OR GAS!

A complete line of Winter Air Conditioning units from 80,000 to 400,000 B.t.u.

You can PROVE higher efficiency with these units. The features make sense to home owners.

Bard prices "put you in" on both small and large home jobs at a profit.

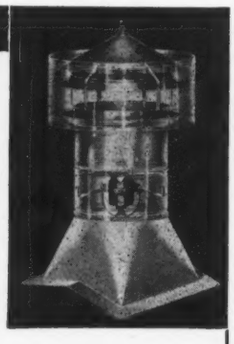
Write for dealer proposition. Bard owners are Bard Dealers' best salesmen.



Model NB 1
For oil—
100,000 B.t.u.

BARD MANUFACTURING CO.
BRYAN — OHIO

You Can Handle the Job Easier with



BURT Ventilators

Installing a roof ventilator job is no problem at all to the contractor who makes use of Burt Ventilators and Burt Service. With the complete Burt line you can fill any need, and Burt Engineers are glad to work with you in estimating and laying out plans. Burt puts you in position to meet every specification, quote favorable prices and make a profit.

THE BURT MFG. CO.
ROOF VENTILATORS • OIL FILTERS
EXHAUST HEADS
301 Main St., Akron, Ohio

SEND FOR CATALOGS
Burt Engineers are glad to help on plans

full amount of the technicalities, instruction may be reduced to a few simple facts which the student can absorb. In teaching a trade or an operation we should abstain from all too much verbosity. Students fail, because all too much irrelevant matter is being taught instead of the few, really mattering facts.

◆

Konzo-Catechism of Proper Firing Methods

(*Continued from page* 45)

canic activity. The more ash you have compacted into a given space, the denser it is and the more resistant to breakage it is.

Question No. 22—In a hand fired plant what can I do to eliminate clinker formation?

Answer No. 22—There are several ways of minimizing or completely eliminating clinker formation, as follows:

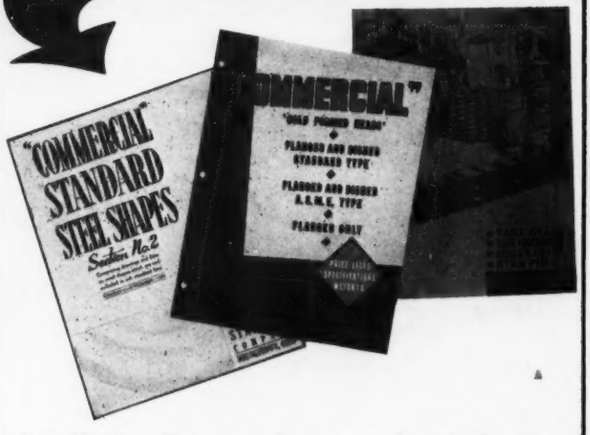
a) try another coal having a higher temperature of ash fusion.

b) keep the ash content in the fuel bed to a minimum by shaking down the ashes.

c) bank the fires at night without adding ashes on top of the fuel bed.

d) prevent overfiring. High combustion rates result in high fuel bed temperatures and hence in slag formation.

INFORMATION



Specification Data manufacturers using steel parts.

Stampings catalog for special parts to order.

Shapes booklet for saving in tool costs using our standard shapes "One or a carload."

Steel head catalog for furnace manufacturers.

Write for one or all.

THE COMMERCIAL SHEARING & STAMPING CO.
YOUNGSTOWN, OHIO

It is possible to form clinkers with any coal if the conditions are just right.

Question No. 23—Speaking of clinkers reminds me of stoker firing. If you don't mind this diversion, will you briefly summarize some of the features about taking care of stokers.

Answer No. 23—Without attempting to discuss stokers in all their details, let us confine our attention merely to the servicing of the units. Briefly, the following servicing will be helpful to the life of the equipment:

a) Use properly sized stoker coal, not larger than about 1 inch in dimension. If larger sizes are used the coal will be crushed as it passes through the feed screw with resulting noise of crunching coal. Crushing also throws an extra load on your stoker motor.

b) Remove clinkers daily. If the clinkers are allowed to accumulate in the fuel bed, the air openings in the stoker retort may become plugged and difficulties may be obtained in maintaining enough air to the fuel bed. Allow the clinkers to cool on top of the fuel bed before removing them, and very little trouble will be experienced with the release of sulfur dioxide gas in the basement.

c) The furnace and smokepipe should be thoroughly cleaned each year at the end of the heating season. Fly ash will accumulate in all horizontal passages and this will not only tend to

Every money making sheet metal man knows them!

DO YOU?

3 TYPES OF ALLEN Turbine Ventilators for 3 Important Jobs!

1. Coni-Vane. The famous "Free Air" Allen Ventilator which gives cost-free powerful suction, and is the standard installation for most ventilating jobs.

2. Electro-Wind. Air plus power. The same Coni-Vane ventilator, with auxiliary electric power available to double the exhaust at a trip of the switch.

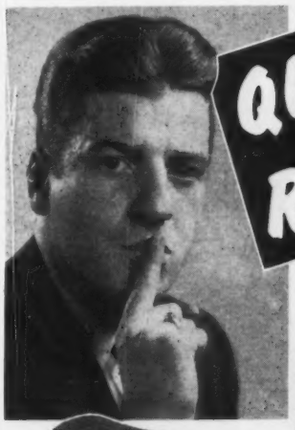
3. Type "C". The vane-less Allen, especially designed for chimney jobs or any ventilation project where lowest cost is demanded.

Illustrated—Coni-Vane

Our engineering department will assist you if desired. Let us send the latest literature for your files, on these 3 types of Turbine Ventilators, and also the many other types of Allen Ventilating equipment for varied industrial uses.

The ALLEN Corporation

9752 ERWIN AVENUE DETROIT, MICH.



QUIET RUNNING

Complete Range of Sizes

Both wheels and complete assemblies are built in sizes to meet any capacity, pressure and speed requirements.

Perfectly Balanced Wheels and Better Bearings Do It!

Use Clarage Fans in your conditioning units and in forced air heating — *and you've licked the problem of noise.* QUIET RUNNING — the result of mechanical superiority — that's why Clarage Fans are so universally preferred.

COMPLETE AIR CONDITIONING • COOLING • VENTILATION • FACTORY HEATING • MECHANICAL DRAFT • FANS and BLOWERS for INDUSTRIAL NEEDS

CLARAGE FAN COMPANY—KALAMAZOO, MICH.

SALES ENGINEERING OFFICES IN ALL PRINCIPAL CITIES

DEFENSE HOUSING PROGRAM
CALLS FOR 625,000 NEW HOMES

Everything YOU NEED FOR AUTOMATIC GAS HEAT IN A PACKAGE. This G. C. T-85 set includes new B-60 Series Gas Valve, pilot generator, new Trimtherm and 30 ft. of wire.

NOW MORE THAN EVER BEFORE
GENERAL CONTROLS ALL-GAS GAS HEATING
PACKAGE SETS MEET SPECIFICATIONS COMPLETELY

FIRST: because the low cost of General Controls automatic gas heating controls brings them within the most modest new or modernized home heating budget.

SECOND: because no electricity is needed and because their design eliminates many critical defense materials, General *all-gas* controls make for easy and simplified installations that everyone can understand and enjoy. Write for details.

GENERAL CONTROLS
801 ALLEN AVENUE • GLENDALE, CALIFORNIA
Branch Offices: Boston • New York • Philadelphia • Atlanta • Cleveland
Detroit • Chicago • Kansas City • Houston • Dallas • San Francisco

USE Randall BEARINGS
ON DEFENSE EQUIPMENT

Defense demands have created a serious shortage in certain types of bearings for specific jobs. Randall is ready to serve in this defense emergency. Let us help to relieve this defense shortage by adopting versatile Randall Bearings to satisfactorily fill your specific requirements.

Whatever your bearing problem, feel free to consult us about Randall self-lubricating, self-aligning Pillow Blocks. They are quiet, dependable, inexpensive, easy to install, and give long trouble-free service in the field with only minimum attention. Write for catalog.

One Piece Steel Housing Pillow Block

RANDALL GRAPHITE PRODUCTS CORP.
Dept. 1211 609 W. Lake St. Chicago, Ill.

reduce efficiencies, but may also result in lack of draft over the fire.

d) The stoker motor should be oiled once a year. Your heating service man should also check the oil level in the stoker transmission once a year. He should also examine the pulley belt and pulley to be sure that the pulley is tightly attached to the shaft and that the belt tension is correct.

e) The feed screw and the hopper are subject to corrosion and the metal surfaces should be cleaned and heavily greased at the end of the season.

◆

Radiant Heat Baking Organic Finishes

(*Continued from page 64*)

dipping and spraying rooms. They should not be set up in small rooms without good ventilation.

Ventilating hoods should be used where an excessive amount of solvents or flammable dust is given off.

Products carried by the conveyors must be so mounted that they do not cause lamp breakage or short circuits.

Lamps and equipment should be kept clean and

SAL-MO Asbestos DUCTBOARD
For making Cold Air Return Ducts
SAVES TIME SAVES METAL

A new asbestos product developed to do the same job usually done with metal.

SAL-MO Asbestos DUCTBOARD is fireproof, moisture-resistant, light in weight and durable.

Made in sheets 33" x 48"—1/8" in thickness—just the right width to cover 3 joists spaced at 16" centers, making 2 cold air return ducts.

Easily applied with hammer and nails or stapler. Samples on request.

SEE YOUR NEAREST JOBBER

SALL MOUNTAIN COMPANY
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free from deposits of flammable finishing materials.

The conveyor should be equipped with automatic control so that the lamps will be cut off if it stops; or if a conveyor is not used, a time-switch should limit the total time of exposure of products to the heat.

Sprinkler protection is desirable, and when used, the radiant heat equipment should be so arranged that it does not interfere with the spray from the sprinklers. Ordinary sprinkler heads can be employed, as the air above the oven is not heated to unusually high temperatures. An ample number of vaporizing-liquid, foam, or carbon dioxide portable fire extinguishers should be quickly available, and all workers in the finishing department should know how to use them.

Conclusion

Many people have contributed to our understanding of this important addition to the facilities of the industrial finisher, and I am indebted to others for much of what I have to say today. The accompanying bibliography lists those who have published important articles on this subject, but much credit is also due to unrecorded workers in the industrial finishing field.

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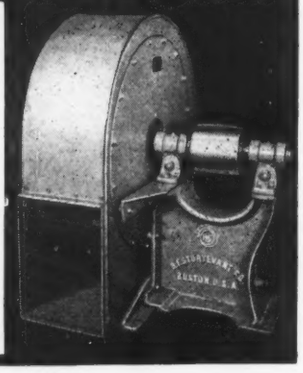

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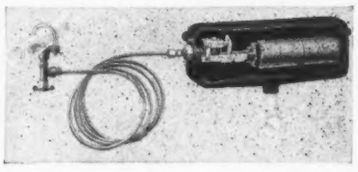

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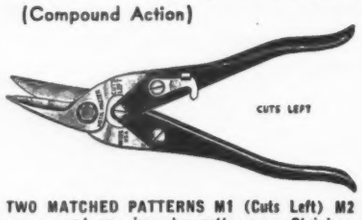

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Researches For Improved Fluxes

(*Continued from page* 68)

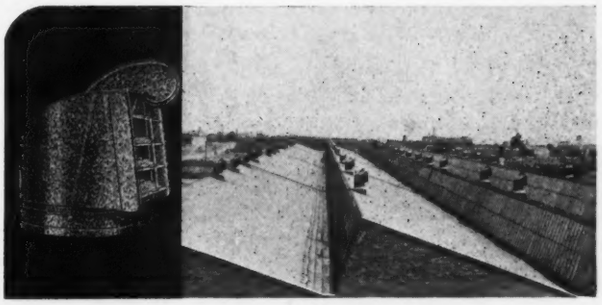
to note the general fluxing characteristics of a large number of materials when spot soldering 14-gauge samples of oxidized copper, and slightly rusted, cold-rolled steel strip. By using exactly the same amount of solder each time and keeping all conditions similar, except the flux, it was possible to evaluate the flux qualitatively and to compare it with resin and zinc chloride as standards. The fluxes were rated as superior, excellent, good, fair, and no good. Rosin was rated fair, zinc chloride excellent.

Some of the organic acids, such as oleic and stearic, make active fluxes but are decidedly corrosive. Partial neutralization with alkalis, such as caustic soda, to form a soap, does not eliminate their tendency to corrode. Neutralization with organic bases, such as ammonia or an amine, offers interesting possibilities, however. In fact, some of the amines and amides, as ethylene diamine and acetamide, have been used as fluxes to a limited extent. Recent investigations have been concerned with ammonium and amine salts of stearic, oleic and palmitic acids, particularly of stearic acid. Many of these salts have been found to be good fluxes for copper; some have appeared to be non-corrosive, and a few effectively flux steel.

The stearic acid salt of diethylene triamine appeared to be particularly attractive as a flux for both copper and iron. It not only made an excellent effective flux, but did not decompose unduly and gave a residue that was as non-corrosive as rosin. Unfortunately, this flux has a disagreeable odor, hence it may not be adaptable where good ventilation is not available. The oleic acid salt of diethylene triamine also was found to be an effective flux on steel and copper, although it was more corrosive than the stearic acid salt. Unlike zinc chloride, it was not hygroscopic and was completely soluble in water without formation of an insoluble oxysalt.

Table I

Stearic Acid Salt of	Fluxing Ability on Copper	Spreading Ability on Copper	Corrosive Action on Copper
Triethylamine	Superior	Superior	Corrosive
Triethanolamine	Superior	Superior	Non-Corrosive
Diethylene Triamine	Superior	Superior	Non-Corrosive
Acetamide	Superior	Excellent	Non-Corrosive
N-butylaniline	Excellent	Excellent	Non-Corrosive
p-aminoacetanilide	Superior	Superior	Non-Corrosive
o-phenylenediamine	Superior	Superior	Non-Corrosive
p-phenetidine	Excellent	Superior	Non-Corrosive
l-naphthylamine	Excellent	Superior	Non-Corrosive
Morpholine	Excellent	Superior	Corrosive



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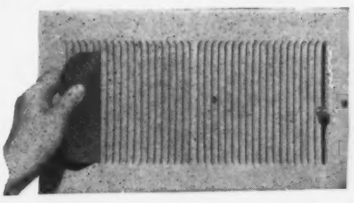

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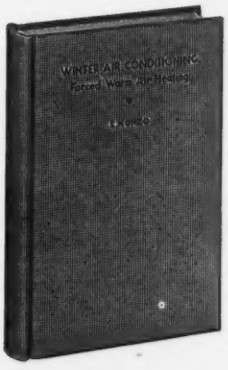

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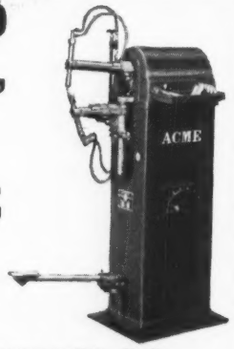

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The superiority of a few of these organic fluxes over rosin in promoting the flowing of solder over an oxidized copper surface is shown in the illustration. Table 1, page 112 gives the rating of stearic acid salts which appeared to be the best of their respective groups. A non-corrosive rating was given if no indication of a green corrosion product appeared on fluxed and soldered copper at the end of a month of observation in the laboratory. In a few cases a slight greenish color developed while soldering, but did not extend on standing. Some of the fluxes decomposed rather rapidly if a relatively high soldering temperature was used, and in most cases proper ventilation was required to maintain good working conditions.

Stearamide, produced by heating the ammoniumsalt of stearic acid, was found to be an excellent flux for copper and gave slight corrosion only while heating during soldering.

◆

Decorative House Specialties

(*Continued from page 72*)

were built in Los Angeles over ten years ago and are now being remodeled. One of these canopies, affixed over each entrance, gives the

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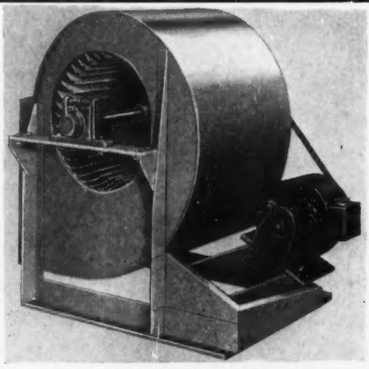

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court a much dressier appearance. Another fairly wide market for canopies has been found among owners of properties occupied by small stores; one placed above each store in the block when repainting exteriors greatly enchances the appearance of the entire front.

Because these can be "nailed up" by almost anyone with slight mechanical ability, cost of installation is very low. Naturally, the pre-fabrication also makes cost lower and this point has a great appeal to architects and contractors. The same thing applies to cupolas and pergolas manufactured at Slauson Avenue Sheet Metal Works. The most popular type is one which can be mounted atop the garage or small home, adding swank to appearance.

In addition to the standard items, the firm also has found an outlet for the canopy of sheet metal for use over store windows and over bay windows in both new and old houses. The canopy gives added dignity and emphasis to the bay window and for that reason many have been sold to be installed in very fine homes.

Modern lines are stressed in the decorative effect of these articles, which once again prove that pre-fabrication of sheet metal offers as attractive an appearance at considerably less cost than other materials. When installed, they appear as an integral part of the building, adding lustre to otherwise commonplace houses or small shops.

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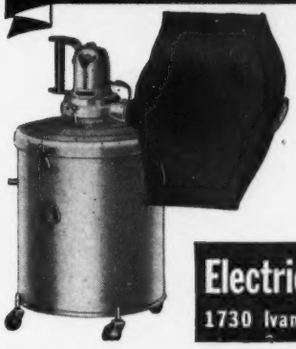

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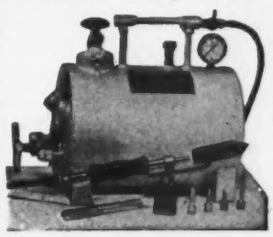

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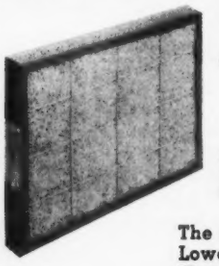

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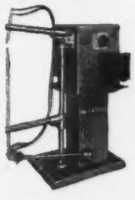

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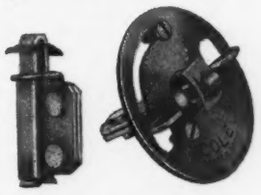

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TAPS OR REVEILLE?

★ "Someday... we'll amputate his reveille... we'll step upon it heavily..." But in the meantime, we are going to do business under a different set of conditions. It's no longer business as usual. Your business and our business is different today. But *changing conditions are merely a new challenge to the initiative of America's business men who believe in free enterprise.* To some it may mean taps—to others a new day, new opportunities for a better and more complete service, better customer relations, better and more secure foundations for future business and profits. Much depends on our viewpoint and initiative.

What are the Immediate Prospects? We are going to have guns—first. That's plain horse sense. But, we are also going to build new homes and modernize old ones in which the men building these guns can live. The Federal government under F. W. A. is building 100,000 homes for defense workers. It has approved the building of an additional 200,000 homes costing $6,000 or less in defense areas financed by private capital.

The F. H. A. has launched its new modernization program, increased individual loans from $2,500 to $5,000 to provide suitable rental property. This means work for thousands of men. It represents a market for your equipment and services. Janitrol outlets can keep busy because Janitrol equipment is ideally suited to the needs of this market. It is compact, uses a minimum of critical materials needed for defense, can be easily installed in closet, utility room, kitchen or basement.

Janitrol has, and will always continue to build the best gas heating equipment possible with the materials available.

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We want your good will. We will do everything possible to deserve it. Every effort will be made to help you secure a profitable share of the replacement and modernization market.

"These are times that try men's souls"—times which may prove men's worthiness and ability to keep free enterprise alive. To some it may mean Taps, to others Reveille.

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JANITROL

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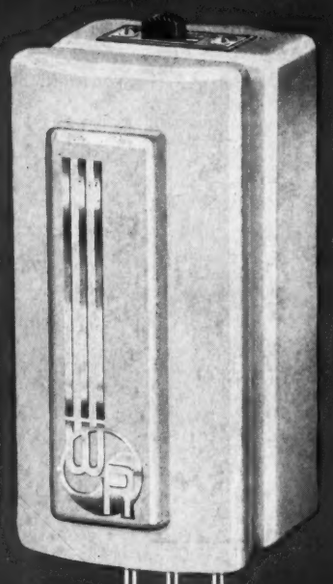

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WHITE POINTER—START OF HIGH TEMPERATURE PERIOD.
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